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The Tasmanian Department of Agriculture

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The Tasmanian
Journal of Agriculture

Vol. VIII Tasmania, 1st February, 1937 No. 1

Editorial

GRASSLAND DEVELOPMENT IN TASMANIA

DURING the last eight years there have been some profound changes in Tasmanian farming methods. One of the most significant has been the widespread development in pasture establishment on arable farms as well as on pastoral properties.

Among pastoralists this was a fairly obvious line of development. The depressed condition of the wool market during the worst periods of the economic crisis called for greater efficiency in flock management and an increase in carrying capacity, and the provision of improved pastures represented the most economical method of attaining the latter objective. On farms devoted mainly to the production of grain, hay and potato crops the need for such development was perhaps less obvious, but the fact of its accomplishment and the likelihood of its further expansion can be regarded as among the most important of the factors which are likely to assist in the rehabilitation of our agriculture.

Since the first steps were taken in this direction some eight to nine years ago the growing of fertility-restoring crops on our arable farms has continuously been advocated. In particular the importance of pastures, together with an increase in stock numbers, has been stressed as a means of correcting the widespread depletion of plant foods and organic matter which has occurred in our soils, and which has contributed so largely to unsatisfactory production. It is interesting to consider, in retrospect, the development which has taken place along these lines, and some of the effects which have resulted therefrom.

Prior to 1928 or thereabouts the laying down of pastures was restricted largely to a few semi-pastoral and dairying properties. The systematic development of grassland on purely agricultural holdings was a rare occurrence, as was the maintenance of livestock in any significant numbers. Sheep were often grazed on stubble feed and the stubbles, when eaten out, were allowed to remain unproductive until again broken up for cropping. Frequently sheep were purchased when an abundance of natural feed was in sight, and sold—at times more or less under compulsion, and possibly on an unfavourable market—when it was exhausted. The maintenance of permanent flocks without pastures, either sown or natural, was out of the question.

To-day there are to be seen many arable farms carrying good grass and clover pastures and supporting permanent ewe flocks. The revenue obtained from these areas has probably been more than equivalent to any returns which could have been obtained from cash crops, while indirect benefits of far-reaching importance have at the same time been initiated. Detailed reference has frequently been made in the pages of this Journal and other Departmental publications, to the fertility-restoring effects of livestock grazing on pasturage and other forage; it will be sufficient here to say that such management has a profound effect on the subsequent cropping ability of the land. Already, on some properties, such a restorative effect has been experienced, particularly where clovers have represented a proportion of the herbage. One frequently hears it mentioned by property owners that crops far superior to those previously grown on ley ground have been produced off ploughed-in pasture or land devoted for two or three successive seasons to the growing of forage crops grazed *in situ*. On properties where this type of development has occurred it is not difficult to visualize, eventually, the production of the normal quota of cash crops off two-thirds of the area previously cropped, while the yearly income is largely augmented by the sale of fat stock or dairy produce obtained off land that would otherwise have carried nothing but weeds and innutritious native grasses while awaiting the plough.

In the grassland development which has taken place during the period under review Subterranean Clover has been pre-eminent. On second-class country it has often been used to pioneer the introduction of species which demand a higher standard of fertility, while its inclusion in mixtures for all soil types has become practically standard practice. It can be said without exaggeration that this plant has effected a transformation in the economy of many farmers and graziers throughout the State. Many examples

could be quoted where its use has resulted in six-fold, and even eight-fold, increases in stock-carrying capacity. Its prolific growth in the winter and early spring months when other types of herbage are at a standstill, together with its adaptability to the poorer as well as the better class soil types, and its soil fertility building properties give it a unique position among pasture plants. Some idea of the development which has taken place in the sowing of this clover can be gained from the amount of seed consumed in the State during the past five years. It is estimated that something like 120 tons has been sown which, at an average seeding rate of 4 lbs. per acre, has established the plant on an area of country approximating 67,000 acres.

The staple grass employed in mixed pastures has been Perennial Ryegrass, a plant which is peculiarly well adapted to the soils and climatic conditions of this State. The average yearly importation of English grass seed for the past five years is estimated at somewhere in the vicinity of 15,000 bushels, so that something like 75,000 acres have been laid down to ryegrass pasture in that period.

A significant development in farming economy which has resulted from the expansion of sown grassland is the growing practice of conserving surplus pasture growth in the form of hay. During the recent harvesting operations in the north of the State the making of grass hay has been a common sight and one which well exemplifies the improvement in farming practice which has occurred in recent years. This method of fodder conservation was, until quite recent times, comparatively neglected, and its adoption on a fairly extensive scale augurs well for the prosperity of the farmers concerned. In this connection the making of grass silage might also be considered as an effective, economical and convenient method of conserving the surplus growth of pastures.

On some properties the saving of grass and clover seeds has represented an important secondary source of revenue from pasture land. The present demand for pasture seeds of satisfactory quality often renders this crop more profitable, per unit of land, than the grain or cereal hay which are in some cases regarded as the staple products of the farm. Especially has the production of certified seed off registered areas proved itself to be a remunerative sideline. Yields of certified Perennial Ryegrass seed reaching 20 and 30 bushels per acre and yielding a gross return in the vicinity of £7 to £10 per acre have been secured, and these returns are subject to no great deduction in the way of expense since all establishment costs are distributed over the life of the pasture and are, in any case, chargeable mainly to the grazing side of the farming

activities. It is true that threshing and cleaning costs represent a fairly substantial deduction, but these are the only important items of expense and are inseparable from any grain or seed producing venture.

The economic effectiveness of pastures is not really experienced until four or five years after their establishment, and the effects of grassland development with its accompanying increase in stock figures and production are but now beginning to assert themselves. One can safely say that the next eight years will see the farming economy of the State developing away from the cash cropping foundation of past years and becoming established mainly on a livestock basis. Such a position will mean a balanced system of farming in which the standard of production will steadily improve while the fertility of our farming lands will, far from suffering adversely, be materially fostered and enhanced.

THE APPLE INDUSTRY IN NORTH-WESTERN AMERICA

By P. H. THOMAS, Chief Horticulturist

DURING a recent visit to America and Canada an opportunity was afforded me to study various phases of the apple industry in those countries. The main impressions gained are set out in the following report which is divided into two parts, the second of which will be published in the ensuing issue of this Journal.

The following apple-growing districts were visited:—

California: Sebastopol, Lake Country, Placerville.

Idaho: Boise, Weiser.

Washington: Yakima, Wenatchee.

British Columbia: Kelowna, Vernon, Okanagan Valley.

In comparing the various rates and costs quoted with Australian currency, the pound should be assessed at its par value of $4.80. Conversion can be simply effected by calculating two cents as the equivalent of one penny.

Production

Washington is generally conceded to be the principal apple-growing State of U.S.A. Here a large industry has been built up by means of irrigation. Areas of land have been reclaimed from the desert and modern cities with 12,000 to 24,000 inhabitants, and replete with all municipal and social conveniences have come into being. For this development the apple has been primarily responsible, and is, directly or indirectly, the main source of income.

During the past six years the industry has been in a depressed condition, and in very few districts are new areas being planted. The reason for this is only partly to be found in the effects of the economic crisis and increased costs of production and marketing. A contributing factor of no small significance is the increasing competition of other fruits, most of which are controlled by very efficient organisations which, by means of attractive advertising, are keeping their products constantly before the public.

In many districts large areas of orchard have been grubbed out or abandoned. In the State of Washington it is estimated that 10,000 acres of once profitable orchard have been removed during the past five years.

Climatic conditions in the North-Western apple States are very different to those experienced in Tasmania. The average rainfall ranges from 9 to 12 inches, and commercial production is only possible by means of irrigation.

One is impressed with the organised effort which is everywhere apparent. The keynote is efficiency. In discussing the relative position as between Eastern and Western centres of production, a number of growers stated that a difference in costs of approximately 90 cents per bushel exists in favour of the Eastern

barrelled-apple trade. It is considered that this disadvantage can only be offset by maintaining a high quality standard in the fruit placed on the home and foreign markets. Costs of production vary considerably, but in an average full-bearing orchard are estimated at from 30 to 36 cents per bushel.

Varieties

In most districts production is centred in proved and popular varieties. Those which predominate are Delicious, Richared, Starking, Winesap, Jonathan, Rome Beauty and Newtown. The market favours the coloured dessert apple, and efforts are being made to improve existing popular varieties by the selection of higher coloured strains. It is considered by some growers and others interested in the industry that this development may, in the long run, prove detrimental in marketing, since it may tend to induce picking to colour rather than maturity, in the natural desire of the grower to take advantage of the earliest market.

The quality of the fruit inspected in the orchards and packing houses can be gauged from the following grading percentages secured by a packing house in the Yakima district. A line of Jonathans consisting of 1,100 cases packed out 85 per cent. extra fancy, 10 per cent. fancy, 2 per cent. C grade, and 3 per cent. culls.

Irrigation

Practically the whole of the production of the North-Western apple districts is dependent on the irrigation systems which have gradually been extended since the early days of settlement. It is not too much to say that irrigation is the life-blood of the country, and its neglect, even for one season, has a disastrous effect on an orchard.

The climate is arid, and under natural conditions the country is barren, the prevailing cover being a low sage bush. The line of demarcation between aridity and available water is very sharply defined; at many places one virtually steps out of a productive orchard into desert. Full advantage has been taken of the snow-fed rivers that flow through the State, and, with the assistance of gravity and pumping stations, large areas of land have been reclaimed for cropping and planting.

Most of the systems are financed by a general reclamation charge applied over the areas served, and ranging from $150 to $200 per acre. Maintenance charges vary, but average an annual rate of $12 to $16 per acre.

In the drier districts of Washington irrigation is applied on an average every ten days during the summer. At Grand Coulee (Washington) a project is under construction which will rank amongst the world's largest hydro-electric and water conservation schemes.

Cultivation and Manuring

From the viewpoint of the Tasmanian fruitgrower cultivation in the average North-Western American apple orchard would appear

rather neglected. Nowhere is clean cultivation practised; on the contrary, every effort is made during spring and summer to develop green cover crops, Lucerne or Sweet Clover (*Melilotus alba*) being most favoured. These are disced in during the following spring. Deep ploughing is rarely practised; irrigation induces a fairly shallow root development and growers are averse to adopting any system of cultivation which might result in root injury or the formation of a soil pan. At the time of my visit harvesting was proceeding in many orchards amongst crops three to four feet high.

Chemical fertilisers were used, generally as a supplement to green manuring, the fertiliser mainly employed being Sulphate of Ammonia.

Costs of cultivation and manuring are lower than those prevailing under dry culture, and to a certain extent offset the higher rate that has to be met for other operations.

Pruning

Pruning is carried out on lines very different to those adopted in this State. The young tree is encouraged to make two or three well spaced limbs and subsequently left almost untreated except for an annual thinning to eliminate all crossed or badly placed branches. The result of such treatment is to produce a fairly close, umbrella-headed tree bearing the majority of its fruits on the outside branches, the long laterals being covered, prior to harvest, with even, well coloured fruit.

Fruit-thinning is generally practised in order to obtain a well-developed and even crop. This operation represents an important item in the annual expenditure, but the outlay is more than repaid by the results secured.

Pest Control

By far the most serious pest the growers have to contend with is the Codlin Moth, the increase and spread of which is causing considerable concern to all connected with the industry. During recent years this pest has been partially responsible for the abandonment of large areas of commercial orchard.

Control is difficult, and only attainable by close attention to treatment, which consists principally of spraying with arsenicals. The problem now confronting the grower is a fourfold one. The intensive spraying under low rainfall conditions results in a heavy spray residue remaining on the fruit, which necessitates the installation of expensive washing machines to bring the deposit within the recognised limits of tolerance. *Every packing house visited south of the Canadian border was equipped with a washing machine.* Washing is estimated to cost 2 to 3 cents per bushel.

There is evidence that this treatment may, by removal of the natural skin-wax, affect the keeping qualities of the fruit, and a firm has already placed an artificial wax on the market to replace that removed by the washing.

The spray residue problem is not so serious in British Columbia, where most packing houses keep their fruit well within the tolerance by means of automatic cleaners. These appear to be quite

effective so long as the revolving wipers are periodically changed. Fruit passing through these machines receives little more than a vigorous dry wiping, which does not appear to cause any injury.

The difficulties do not end with the problem of spray residue on the fruit. The constant heavy application of arsenical sprays under light rainfall conditions is affecting the fertility of some of the surface soils and in some cases difficulty is being experienced in growing the necessary green cover crops.

Efforts are at present being directed towards finding an effective substitute for Arsenate of Lead. Several preparations have shown promise under test, particularly Oil-Nicotine.

A further problem is that which exists owing to neglected or semi-abandoned orchards, which constitute a breeding-ground for Codlin Moth and other pests.

Other pests of economic importance are the Red Spider *(Tetranychus telarius)*, Tarnished Plant Bug *(Lygus pratensis)*, and several species of Jassids. The treatments adopted for control of these pests are similar to those used in Tasmania, and embrace Oil-nicotine combinations.

Fungus diseases, with the exception of Powdery Mildew and Scab *(Venturia inaequalis)*, are practically unknown. The latter is confined to the North Okanagan Valley, where it is sometimes troublesome.

Bitter Pit was practically non-existent at the time of my visit, though it is experienced to a certain extent in British Columbia, especially in Cox's Orange Pippin. However, the majority of growers producing this variety realise the important influence which maturity and tree yield exercise in the development of the disease.

Grading Regulations

The grade standards adopted by the different States and Provinces are very similar to those which we now have in Australia, except that higher colour requirements are specified for popular dessert varieties such as Delicious and Jonathan. There is also a slightly greater tolerance permitted for insect blemishes in the fancy grade. A maximum percentage of fruit with two healed-over stings is allowed.

Packing is not limited to specific size-groups as in Australia. The regulations specify "fairly even sizing," and under this definition the whole of the packing houses operate on the count system.

The combination of certain grades is permitted, but is generally subject to a provision that the case must contain at least 25 per cent. of the higher grade. For the overseas export trade only extra fancy and fancy grades are used.

Picking

The majority of the States export to Europe, and, although they naturally desire to take advantage of the early market, picking is invariably delayed until the fruit is well advanced towards maturity.

Bags similar to those employed in Tasmania are used for picking, and the fruit is placed directly into export cases which, owing to the warm, dry weather experienced at harvest time, are seldom soiled to any extent; moreover, the smooth pine timber is not affected to the same extent as eucalypt timber.

Picking costs are estimated at 3½ to 4 cents per packed bushel.

Grading and Sizing

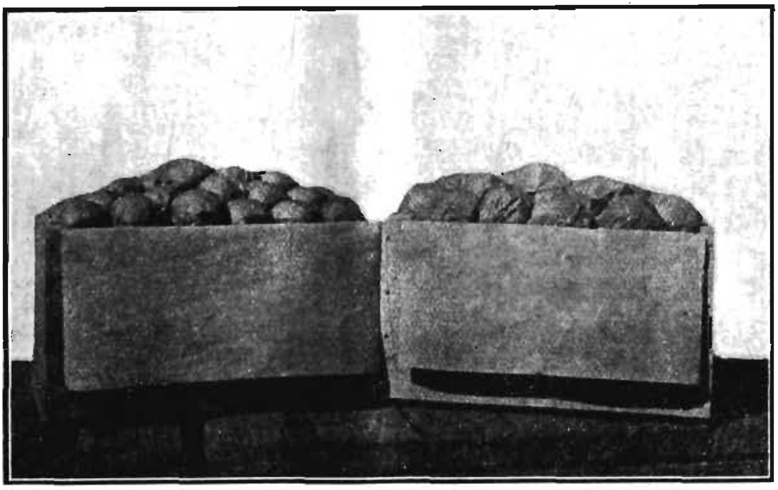
The machine most generally favoured for grading and sizing is the Cutler type, though some of the smaller growers continue to employ the "Ideal" type. Machines are now built by the manufacturers to suit requirements, and the problem practically resolves itself into the question of the number of units necessary to handle the pack. An average unit of the Cutler type will put through 10,000 to 12,000 packed cases per day.

CUTLER GRADER EQUIPPED WITH REVOLVING BINS
Sebastopol, California.

Throughout all centres the most striking feature of grading and sizing operations is the amount of care devoted to sorting. With the type of machine described some 15 to 20 hands are employed at the sorting table. Practically every apple is inspected as it passes over the table and is hand placed on the conveyor belt according to grade. Any fruit missed returns automatically for re-inspection. In order to facilitate examination, special lighting is provided, eight to ten "daylight" electric bulbs being installed on each side of the table.

Sorting operatives are paid 25 cents per hour, and the whole operation of sorting and grading is estimated to cost 2 to 3 cents per bushel.

THE USE OF THE CROWN PACK WITH PEARS.
Lake County, California.



THE CROWN PACK WITH APPLES.
Penticton, British Columbia.

Packing

The system of placing the fruits in the cases is known as the straight pack and resembles that used by the more progressive Tasmanian packing houses, except that a higher and heavier pack is generally turned out. When the case is filled, the peak or "crown" apples are sometimes 2½ to 3 inches above the top, while that at the sides and ends is little more than half-an-inch above case level.

A general impression exists that this crown is obtained by selecting slightly smaller apples for the end positions, but such is not entirely the case. While packers may use any smaller apples

in the bins for these positions, the main principle is a constant firm pressure on the side apples, as well as those at the end, as each is placed in position. The central apples are placed without this pressure, which results in the gradual building of a "crown" throughout the pack.

North-Western growers generally are of the opinion that the height of the pack and the resultant case bulge have, in many instances, been overdone, and that fruit deterioration has resulted owing to bruising. During recent years efforts to fill the case to its maximum capacity have brought about a number of "freak" packs which are now generally discouraged.

At several of the centres visited facilities were made available for obtaining data on packs and fruit weights, etc. These data are summarised in the following table:—

Pack	Row	Count	Weight (lbs.)	Approx. Size (in.)
		Jonathan		
3 x 3	6 x 6	216	45	2⅜
3 x 2	6 x 6	150	44	2¾ and slightly under
3 x 2	5 x 5	125	43½	2⅞
		Delicious (Richared)		
3 x 2	7 x 6	163	51	2⅝
3 x 2	6 x 6	150	51	2¾
3 x 2	5 x 5	125	49	2⅞
2 x 2	7 x 7	112	48½	3

Fruit packed for local or interstate marketing is generally placed in containers lined with a special crimped paper. Red is used for extra fancy, blue for fancy, and white for choice grade. For overseas export corrugated cardboard or paper padding is used. A packer's slip, bearing the operator's number, is generally inserted in each case.

Oiled-paper wraps are favoured by most packing houses, and are always used when fruit is to be consigned directly into cold storage. At Penticton, British Columbia, a consignment of Delicious packed for shipment to New Zealand was inspected. This fruit was carried in the cool-room of the vessel in which I returned to Australia. It arrived in good condition, with the initial average case bulge of 2½ inches reduced during the voyage to approximately 1¼ inches.

Packing costs range from 28 to 34 cents per bushel.

The second part of the report will deal with those phases of the industry connected with cases, inspection, cold storage, marketing, apple by-products, and advertising. Certain recommendations regarding methods employed in this State will also be published.

SILAGE MAKING, AND ITS EMPLOYMENT IN THE CONSERVATION OF SURPLUS PASTURE GROWTH

By F. W. HICKS, Agricultural Superintendent

THE practice of making silage from the surplus growth of pastures is a recognised operation in many parts of the world where grassland farming is pursued. It is a convenient and economical method of storing the herbage and ensures a supply of palatable and highly nutritious food for those periods of the year when hand feeding is necessary. It is, in certain respects, to be preferred to the conservation of pasturage in the form of hay. The material is cut while still green and retains its succulence and high feeding value, while the recovery or aftermath growth of the pasture is little affected.

Silage making has not, in the past, been adopted to any extent in Tasmania, but an appreciation of its value is gradually becoming apparent, and it is anticipated that the method will be widely adopted within the next few years. The main reason for its past neglect is to be found in the erroneous belief, common to many farmers, that the turning out of a satisfactory product is a matter surrounded by obscurity and difficulty. It may safely be said that any farmer who can make grass hay of satisfactory quality can embark with confidence on the project.

The past season has been a particularly difficult one in the lower rainfall areas of the State, and the provision which has been made to meet the unfavourable conditions has, in many cases, been quite inadequate. Poor lambing percentages and heavy stock losses have been common, and there is no doubt that much could have been done to mitigate the position had pastoralists made provision in more favourable seasons for the conservation of an adequate fodder reserve.

A very apparent weakness in the sheep management of the State is the manner of caring for weaners. Ewe weaners of to-day are the breeding ewes of the future, and the soundness of the methods employed in their feeding and management until of breeding age must have a direct bearing on their development and on their capacity to rear good lambs. In seasons of feed shortage weaners are often turned out on the runs in order to conserve what feed is available for the ewes. The result of such treatment is that the weaners are under-nourished during the most critical period of their development when every effort should be directed towards ensuring a good constitution. When deprived of adequate nourishment the vitality of the weaner is lowered and it is rendered susceptible to invasion by worms and other parasites; losses are high, the fleece is scanty, and fecundity is lowered. Difficulties of this nature could largely be overcome by the provision of an adequate reserve of silage.

The making of silage is commonly regarded as a laborious and tedious undertaking, but the introduction of elevating machinery has reduced heavy lifting to a minimum, while the various phases of the work are actually less tedious and difficult than many of those associated with hay-making. For instance, the work of carting and stacking can proceed without interruption in wet seasons when hay-making would be out of the question, while the material is much easier to handle in windy weather than hay.

A decided advantage which the method has over hay-making is that crops containing weeds such as Charlock, etc., can be cut before the weed seeds are ripened and shed. In this way material which would, as a constituent of hay, tend to lower its quality, is converted to a more useful purpose and fouling of the land is at the same time prevented.

The first consideration in approaching the problem is to decide on the type of silo to be used. Generally speaking, the two main types suitable for this State are the pit and the stack. On certain of the coastal areas the hillside silo will, under some conditions, be found useful.

The pit silo is adapted to the lower rainfall districts, and its construction is a comparatively cheap and simple undertaking. Selection of the site is all-important. It should be well drained and, if possible, handy to more than one paddock, which facilitates the feeding-out of the material and filling of the pit in subsequent seasons. A suitable location having been selected, the pit is excavated by means of the plough and scoop, a little hand work on the sides being necessary to secure an even surface. In order to allow the waggons to be drawn through, and to facilitate unloading, the pit should be constructed with a grade of one in three at each end. A pit capable of holding 100 tons of silage would require to be of the following dimensions:—Average width, 13 feet; depth, 8 feet; length, 50 feet.

The use of the stack has the advantage of its being located in the paddock where the material is growing, and of doing away with the necessity of any constructional work. No preparation is required as in the case of a haystack; the only essential is the selection of a well-drained site. The principal requirement is a correct decision as to the size of the stack, and this can only be determined by estimating correctly the amount of material available in the paddock. It is a fatal error to construct a stack with too large a base. A round stack having a diameter of 18 feet will hold 50 tons of silage, more or less, depending upon the height of building. With the employment of a 22-foot base 70 tons can be accommodated. The higher the stack is built the better, within reasonable limits, as by this means the maximum amount of pressure and air exclusion are ensured.

Small stacks, containing less than 30 tons of silage, are, on account of their tendency to slip, difficult to build. Slipping is at times experienced in stacks of any dimension, and is caused by the material settling unevenly under the influence of wind pressure on one side of the stack. The difficulty, if it occurs, usually does so after the second day of stacking, and the risk can be minimised by

building the stack around a central pole set about 3 feet in the ground. Guy ropes are attached to the top of the pole and anchored at the four cardinal points of the compass. The ends of the ropes should be secured at some little distance from the stack to permit the teams to pull in without difficulty. A stack of reasonable dimensions, properly built, is not, however, likely to slip. A matter of some importance when building a stack is to pull the sides properly. If this is not done a certain amount of wastage is likely to result.

The Chemistry of Silage Making

The freshly-cut grasses and clovers are still living when ensiled and, in the pit or stack, undergo a certain amount of chemical decomposition in the course of which they are "pickled" in their own decomposition by-products. The plants breathe in oxygen and exhale carbon dioxide, at the same time generating heat, the degree depending on the amount of air present in the stack. This heating up is essential to the preparation of a first-class product, but it is necessary that it should be controlled. The plants are soon killed, but the heating up process continues owing to the breaking down of the starch and protein into simpler compounds by ferments. At the same time bacteria commence the decomposition of the plants, breaking the starches down into sugars, and the sugars into acids. The latter eventually destroy the bacteria and the material gradually cools down. The making of the silage is now completed, the product having been pickled in the acids produced. This explanation gives the key to successful silage-making and the elimination of waste. The fundamental point involved in turning out a first-class product is the exclusion of all air from the pit or stack as soon as the decomposition processes have proceeded sufficiently far. Neglect of this important requirement will lead to the decay of the material owing to the action of moulds and bacterial organisms. The following are the chief factors which contribute to the exclusion of air, viz.:—

1. Rapid building of the material into the stack or pit.
2. Cutting the material while it is still green and sappy—the moisture in the plants gives weight to the material and allows it to be packed down into a solid mass. (Material which has been allowed to become too mature before cutting, and is in consequence somewhat dry and fibrous, should be watered during the building of the stack. This provides the necessary moisture and prevents overheating).
3. The principal agency by which air exclusion is secured is pressure. This is applied by the weight of the material itself as the building of the stack proceeds; by tramping, by drawing the teams over the material as it is built up in the pit, and, finally, by the addition of weighty matter on the top of the stack when building is completed. For this latter purpose earth is to be preferred as it seals the stack effectively.

The covering of earth requires to be 1 foot deep on the outside and 18 inches in the middle. In the case of the stack silo the soil can be raised to the top by the use of the elevating machinery, while the use of the scoop is the easiest method of covering the pit.

Various methods are employed for keeping the earth on the outside of the stack in position. Tea tree branches or fencing posts, bags filled with earth, or old sheets of iron cut in half lengthways and held in position by stout stakes driven into the stack and wired together, are all satisfactory.

Four different types of silage can be produced, depending on the condition of the material employed and the method adopted in the making of the product.

Green, Fruity Silage.—This is the most desirable type and can only be made by using green, young herbage and building rapidly. It is olive green in colour, has a pleasant aroma, is eaten greedily by stock, and is highly digestible.

Light Brown or Yellow-Brown Silage.—A desirable type produced when only a moderate amount of air is allowed access to the stack and the temperature range does not exceed 84° to 104° Fahrenheit. This type is commonly made in pit silos. It is readily eaten by stock.

Sweet, Dark Brown Silage.—This class of silage is sometimes almost black in colour, and results from excessive heating up of the material. Silage frequently turns out in this condition when comparatively dry herbage has been stacked without the addition of water.

Sour silage results from the ensiling of immature and highly succulent material. It packs down very closely and air is excluded to such an extent that little heating is possible. It has an unpleasant smell, but despite this is readily eaten by stock, which appear to find it palatable. This is the least desirable type of product.

Feeding and Costs

Some consideration of the costs associated with the making of silage is necessary. The construction of a pit is not unduly costly since the outlay is distributed over the period of its usefulness, which may extend over a considerable number of years. Silage can be put into a stack or pit for about 5/- per ton. This estimate is based on costs carefully recorded in connection with the Derby Demonstration Area, where the cost was ascertained to be 4/6 per ton.

It is estimated that ewes can be fed on silage at a cost of approximately 2/- per head. Two hundred tons would support 1,000 ewes for four months, feeding a daily ration of 3 lbs. per head.

The following facts and figures relating to the feeding of 700 weaners for six months on silage and turnips were supplied by a northern property owner. Feeding was commenced during April and continued until September. During the whole period the weaners made satisfactory headway and came through in very fair condition. A pit silo was used, and the cost of filling it amounted to 5/- per ton. The feeding was done by a boy whose keep and wages for the total period amounted to £39. Eighty-five tons of silage costing £21/5/- was used, the total cost being £60/5/-, or 1/8½ per head. Had a reserve of silage not been available it is

doubtful whether the owner could have carried these weaners without heavy mortality and a serious check to development.

It is sometimes found that sheep will not take readily to silage unless they are more or less starved onto it, but once they acquire the taste no further difficulty is experienced.

Silage should have a definite place in the fodder conservation of the drier districts of the State, and should appeal to stock-owners for the following reasons:—

1. It can be kept for years without deterioration.
2. It is immune from damage by mice and rats.
3. It is non-inflammable, and hence there is no fire risk.
4. Its possession engenders a feeling of confidence and security, however bad may be the seasonal prospects.

THE VALUE OF EFFICIENT CULTIVATION

Crop yields are often limited by insufficient or inefficient cultivation. The working of fallows and the intercultivation of root crops has three important objectives. Often the only one accorded recognition is the suppression of weeds. This is important because weeds deprive crops of moisture and sunlight, which are essential to growth. Other effects of cultivation are, however, worthy of consideration. One of the most valuable of these is the storage of moisture by the maintenance of a loose layer of surface soil. If summer cultivation is commenced early and a few surface inches kept thoroughly loose, reserves of moisture are created which will tide the crop over dry periods. The third objective (and a highly important one) is the thorough æration of the soil which accompanies frequent stirring with cultivating implements. Such treatment results in the elaboration and storage of plant foods which are directly available to the crop, and account, to a considerable extent, for the increased productivity of crops grown on well-prepared fallows.

Extension Service

TOBACCO TRIALS IN NORTHERN TASMANIA

By D. H. MALCOLM, District Agricultural Officer

FOR some years past, tobacco has been grown commercially in the Derwent Valley in Southern Tasmania, and, in view of the satisfactory results obtained in this district, it was decided to utilise portion of the subsidy granted by the Commonwealth for tobacco experimental work in determining the suitability of other localities in the State for this crop.

Following upon a survey of the position, two apparently suitable areas representative of fairly considerable tracts of land were selected. It is not suggested that these are the only localities in the Island suitable for tobacco growing; other pockets of soil are known to exist upon which the crop can be grown, but the existence of any extensive areas other than those in which the trials were located is unlikely.

The centres selected for trial were Edith Creek, in the Smithton district, and Tongannah, in the vicinity of Scottsdale. At Edith Creek an area of virgin bush land was chosen, and was cleared during the winter of 1935. The land selected at Tongannah had, on the other hand, been cultivated for some years. The following table sets out the chemical analysis of soil samples drawn from both trial areas, and for purposes of comparison the analysis of a typical American tobacco soil is also given.

TABLE 1

Comparative Soil Analyses

	Tongannah	Edith Creek	Nth. Carolina
	%	%	%
*Organic Matter	12.32	6.0	1.2
Silica	80.07	93.0	93.5
Oxides, Iron and Alumina	6.80	.2	3.1
Lime	.22	.24	.23
Phosphoric Acid	.07	.13	.04
Potash	.14	.02	.5
*Containing Nitrogen	.10	.10	

The analyses given above indicate that both the soils selected for trial are of low fertility—a necessary factor in the production of high-grade leaf—and compare favourably with the soil of North Carolina. The sample from Edith Creek, especially, approximates very closely to its American prototype. The soil at this centre is a very fine grey sand, overlying white sand or yellow clay at a depth of from 18 to 24 inches. The majority of the land is still in its virgin state, and an outlay in the vicinity of £20 per acre will be required to bring it under the plough. Adequate provision for drainage would be essential.

At Tongannah the soil type is of granitic origin, and is for the most part a brownish, silty loam carrying a high proportion of quartz crystals. Clay subsoil occurs at depths varying from 9 to 18 inches. This soil type lies at an elevation of some 600 feet above sea level, and extends over an area of some thousands of acres. The area available for tobacco will, however, be limited to those sections in which irrigation can be supplied. It is known that such facilities are available in certain parts of the district.

Second only in importance to soil type is the question of rainfall and temperature. Details regarding these conditions, as experienced in the selected areas, are set out in the following table, in comparison with those obtaining at North Carolina (America) and Bushy Park (Tasmania). The temperatures quoted for the two centres at which the trials are being conducted, namely, Edith Creek and Tongannah, are those recorded at Stanley and Launceston respectively, the nearest towns at which these data are recorded.

TABLE 2

Average Monthly Rainfall and Temperatures

		Nov.	Dec.	Jan.	Feb.	Mar.	Total
Edith Creek—	Average Rainfall	364	320	232	243	273	1432
	Rainfall, 1935-36	425	123	87	54	241	930
	Temperatures	55.6	59.8	62.7	62.4	56.9	
Tongannah—	Average Rainfall	261	271	240	172	258	1202
	Rainfall, 1935-36	226	149	126	93	145	739
	Temperatures	57.6	62.9	65.9	65.4	62.6	
Durham, Nth. Carolina—	Average Rainfall	332	415	447	472	313	1979
	Temperatures	66.2	74.9	78.4	76.4	72.6	
Bushy Park, Tas.—	Temperatures	57.3	62.7	64.4	63.7	59.7	
	No rainfall figures available						

It will be seen from the above table that both rainfall and temperatures are lower in this State than in North Carolina. It may safely be assumed, considering the higher temperatures in U.S.A., that a greater precipitation would there be required to compensate for the loss of soil water by evaporation, and that consequently the rainfall at both Edith Creek and Tongannah would, under normal conditions, be sufficient for the satisfactory growth of the tobacco crop. Such, it is believed, is the case at Edith Creek, but at the other station the nature of the soil and the fact that the average monthly rainfall is near the minimum required, gives rise to the belief that irrigation will be necessary in certain seasons.

It will be noted that the average monthly temperature at both the centres tried is from 10° to 15° lower than that experienced at Durham, and this would appear to be a possible limiting factor to the successful growth of the crop. It is of interest, however,

to note that the average monthly readings for Bushy Park, the present centre of tobacco-growing in Tasmania, approximate closely to those recorded for both the trial stations.

Experimental Details

Edith Creek.—The area, which comprised approximately half-an-acre of grey sand, was selected in its virgin state in May, 1935, and clearing operations were commenced immediately.

Ploughing was begun soon after completion of clearing, and attention was given to the necessary drainage. Arrangements were made for half-a-ton of burnt lime to be applied to the area, but it was found subsequently that this quantity had been exceeded. As was only to be expected, the ground, being newly cleared, was extremely sour, while the presence of bracken roots rendered thorough cultivation difficult.

EDITH CREEK AREA AFTER FIRST PICKING HAD BEEN MADE
Curing barn in the background.

Seasonal Conditions

The rainfall was 5 inches below the average, and the semi-doughty conditions had a serious effect on both the yield and quality of the crop. Quality was affected by a progressive deterioration in colour, and unsatisfactory leaf texture, these effects becoming more marked with each successive curing. The first barn consisted almost entirely of lemon and bright mahogany coloured leaf, with practically none showing a green colouration. Later curings yielded more and more green leaf, while that which had coloured was dull and unattractive in appearance and often woody in texture.

Grading and Sale Results

The leaf secured from the plot was graded, and after being pressed was shipped to Launceston, where its quality was appraised by a representative of the British-Australasian Tobacco Company. The following table shows the weight of leaf of each grade secured from the plot, together with the price received.

TABLE 3

Edith Creek Plot

Weights of Graded Leaf and Sale Prices

Grade	Weight (lbs.)	Price per lb.	Return
BM1	14½	3/2	£2 5 11
BM2	43	3/–	6 9 0
BM3	75½	2/8	10 1 4
IB2	34	1/8	2 16 8
IB2/X	52½	1/6	3 18 9
IB2/G	78½	1/2	4 11 7
Scrap	9½	Not offered	——
Total yield from ½-acre plot	307½		£30 3 3

Average Price per lb.: 24.3d.

For the benefit of those unfamiliar with the marketing of tobacco it should be explained that the letters BM above refer to "Bright Mahogany," IB refers to "Inferior Bright," while $\frac{IB2}{X}$ is the same grade but slightly inferior in quality. $\frac{IB2}{G}$ is leaf graded as "Second Inferior Bright" but carrying a decided green tinge. It is worthy of note that the leaf graded BM1 and BM2 was actually lemon in colour, but owing to its small size and poor aroma was not acceptable at the price rates prevailing for lemon leaf.

From the above table it will be seen that the crop yielded at the rate of 615 lbs. per acre and gave a cash return at the rate of £60/6/6 per acre. In view of the adverse season and the condition of the soil, this may be considered satisfactory, particularly as the whole of the crop was classed as bright leaf.

Tongannah

The trial area at this centre also comprised approximately half-an-acre, and was planted on November 12th, 1935. The soil had previously been used for growing vegetables, and, although it had not been heavily manured, the application of a nitrogenous fertiliser was considered to be unwise. Fertilisers were therefore confined to Phosphates and Potash, 6 cwts. Superphosphate and 1 cwt. Sulphate of Potash being broadcast just prior to transplanting.

VIEW OF EXPERIMENTAL AREA, SCOTTSDALE

Very dry weather set in shortly after transplanting, and continued until harvest, the total precipitation for the season being 739 points as against an average of 1,202 points. The crop was irrigated on three occasions, but owing to a misunderstanding the quantity of water applied was insufficient. The majority of the crop was thus delayed and harvesting, which commenced on February 14th, 1936, was not completed until April 12th. During the first two curings a quantity of leaf was spoiled owing to the faulty construction of the barn, which had been newly erected. The leaf from this area was offered for sale on the same date as that from Edith Creek, and the following table sets out the weight of each grade and the price received.

TABLE 4

Tongannah Trial

Weights of Graded Leaf and Sale Prices

Grade	Weight (lbs.)	Price per lb.	Return
BM3	41	2/8	£5 9 4
M1	157½	2/3	17 14 5
M2	259	1/9	22 13 3
Inferior Mixed	110 approx.	Not offered	—
Total yield from plot	567½		£45 17 0

Total Amount of Leaf Sold: 457½ lbs.
Average Price: 24d. per lb.

In this instance it will be seen that the rate of yield of marketable leaf per acre was 915 lbs., while the rate of gross return per acre was £91/14/-, which represents a very satisfactory figure. The leaf, on the whole, being somewhat heavy textured and dark in colour, although of good aroma, could only be classed as good usable tobacco.

It will be noted that approximately 110 lbs. of leaf was not offered for sale. This comprised heavy dark leaf of poor quality, leaf badly wind-damaged, and leaf spoiled in the first two curings as the result of a faulty barn. Some 25 per cent. of this leaf may be saleable this season, but the majority, having no value, will be destroyed.

Discussion

Conclusions cannot safely be drawn from the results of one year's work, but it may be said that the outcome of both trials to date is encouraging, particularly as the season experienced was most unfavourable.

The average price for the leaf grown at both centres was approximately 2/- per lb., and this may be regarded as a satisfactory return. It is considered, however, that the quality of the leaf will require to be improved before any extensive scheme of planting can safely be undertaken. This should not prove an insurmountable difficulty under normal conditions. Further, the yield of the crop at Edith Creek should materially be increased when the rawness of the soil is counteracted by further cultivation.

In the event of further tests indicating that satisfactory yields can be maintained and leaf produced superior in quality to the average standard of Australian production, the future of tobacco-growing in these centres is very promising. Until this is proved, however, any development must be undertaken with caution.

Pests and Diseases

Both trial areas were practically free from diseases. At both stations a few plants were found affected with Mosaic and Drought Spot was fairly prevalent, but no other diseases were apparent.

Minor damage was done in the early stages by cutworms, while leaf miner was present to a limited degree at harvest time. Budworm and stem borer caused no damage at either centre.

In conclusion, it is desired to acknowledge the whole-hearted co-operation of Messrs. S. Sutchkoff and G. Hardwick, on whose properties the trials were conducted, and whose keen interest in the work was largely responsible for the success of the undertaking.

THE REARING OF CALVES, AND SOME COMMON CALF AILMENTS

By W. G. BENNETT, District Veterinary Officer

THE rearing of healthy calves depends largely on the application of sound principles of management. Little more is required than the observance of simple and commonsense rules in feeding and handling. In this article the essential principles of management are outlined and some of the commoner ailments of calves are discussed, together with the best means of treating those conditions most likely to be encountered.

At the outset the question arises as to whether it is worth the dairyman's while to rear his own calves. There can only be one answer to this—a very emphatic affirmative. Reliance on purchases to maintain the numbers of the herd imposes a twofold handicap. The productive capacity of cows brought in from outside sources is more or less an unknown quantity, while there exists a distinct possibility of introducing disease which may be communicated to other members of the herd. In the breeding of first-class stock the first essential is a pure-bred bull with a satisfactory production record. The rearing of stock sired by a scrub bull is certain to be an unprofitable venture. The view is commonly expressed that pigs make better use of skim-milk than calves, since they give an earlier return. In the long run there can, however, be no question as to the advantages of rearing dairy heifers bred on sound lines.

The Principles of Feeding

The most important influence in maintaining stock health is correct feeding, a principle essentially applicable to calves. Little trouble is likely to be experienced in the case of mother-reared animals, which receive a correctly balanced food under the most hygienic conditions. The bucket-fed calf is, however, subject to many complaints.

For a short period after calving the milk contains certain constituents which are necessary to the calf during the first few days of its life. The most important of these are substances which have a laxative effect and those which give the calf resistance to intestinal infection. It is most important that the newly-born calf should receive the milk with these excretions intact. After several days have elapsed a gradual change may be made from whole milk to skim-milk, substituting a small portion of the latter for the former every few days for a period of four to five weeks. Sudden changes of feed invariably set up digestive disorders and are to be avoided.

It becomes necessary, as the whole milk is eliminated, to replace those essential articles of diet removed in the skimming process. The most important substances lost are fat and vitamins. Some of the latter are required for the proper assimilation of

minerals and are only soluble in fat. Since the fat present in milk is animal in origin, any substitute used to replace it must similarly be derived from an animal source. Of all the substances readily available, cod-liver oil or muttonbird oil is probably the most satisfactory. Both are cheap, effective, and easily digestible. Linseed meal is often used, but does not fulfil the requirement for an animal fat.

Although skim-milk contains minerals it will be found that calves thrive best if these are supplemented by the addition of bonemeal or boneflour. Either of these substances is liable to settle in the bottom of the bucket; consequently, the milk should be stirred constantly while the calf is drinking. The addition of limewater is a further advantage, especially if bonemeal is not available. It is valuable not only on account of its mineral properties, but also because it aids materially in digestion by rendering the curd more easily assimilable. Limewater can always be kept available by putting 20 lbs. of lime in a vat or barrel and adding about 10 gallons of water. Some of the lime will settle in the bottom and remain undissolved, and this can later be utilised by the addition of more water.

When the calf is about two months old the gradual substitution for milk of other foods such as hay, roots, crushed grain, or oilcake may be commenced. These should be fed in slowly increasing quantity until milk is discontinued entirely. Provided care has been taken in feeding this can take place at the end of six months. The change-over to other foods can well be initiated by the addition to the milk of crushed linseed and pollard, boiled for half-an-hour in water. The proportions for mixing are:—3 lbs. of linseed and 2 lbs. of pollard in 4 gallons of water. Small quantities should be added at first, increasing to a maximum of one pint at each feed.

Feeding Management

Under natural conditions the calf receives its milk at body temperature, and when hand-feeding is resorted to the food should be kept at about this temperature. Should this condition not be observed indigestion and scours are liable to result.

Mother-reared calves take their milk in small quantities and at frequent intervals, and this is necessary to ensure freedom from digestive troubles. Owing to the amount of time involved it is not possible, when feeding calves artificially, to give the food in this way, but an effort should be made to feed at least three times daily. Calves left unduly long without food tend to feed in ravenous gulps, with the result that the milk curdles and gives rise to indigestion. Overfeeding is inadvisable, because it overtaxes the animal's digestion.

The practice of giving food from troughs definitely encourages undesirable feeding habits. Under these conditions fast drinkers obtain more than their share and thus become gorged, while the slower ones tend to gulp hurriedly in an attempt to keep pace. Individual feeding is much the best method. It obviates the foregoing difficulties and tends to prevent the spread of any contagious disease which may be present in individual calves. The ideal is

to have feeding bails in which the bucket can be set down and the calf allowed its own time in which to drink without interference from others. Further, the method economises in time and permits of greater convenience.

The observance of strict cleanliness in all feeding arrangements is essential to the well-being of the calf. Stale milk is an ideal medium for the breeding of germs, which are a prevalent cause of scours. It is necessary that all feeding utensils should be thoroughly cleansed and boiled after use. They should then be hung up in a clean place where fresh air can circulate. Exposure to the sun is also an advantage.

Shed and Run Management

During the first few weeks of the calf's life it may be necessary to provide shelter from cold and rain. Any shed or barn used for this purpose should be clean, warm, and well ventilated. A clean yard or small paddock in which the animal can run on fine days will be found of great benefit. With increasing age the calf should spend more time in the open in order that it may have the exercise essential to health and the building of a sound constitution. The run should, however, have some form of protection such as a hedge or the walls of buildings. The provision of such shelter has a twofold advantage. The animal is protected from chills, while less food is required for the maintenance of body heat. In no circumstances should the same run be used continuously for calves. Such areas become fouled by the accumulation of excreta and other organic matter. Where this has occurred there is certain to be a concentration of worms and disease-producing organisms which will cause the infection of any healthy calves using the run. An area soiled in this way should be ploughed and given a heavy dressing of lime. It should then be spelled for a season before again being used as a calf-run.

Calf Ailments

Scours of various forms are among the commonest ailments to which calves are prone. In early infancy scours are manifested as a thin, whitish excretum, while in later life the colour is black. Scours can roughly be divided into curable and uncurable forms. Among the latter are white scour and calf septicæmia. Both of these diseases are preventable, however, by proper attention to cleanliness in surroundings and feeding utensils.

Among the curable forms is included a simple diarrhœa which invariably results from the feeding of cold milk. It is also liable to be induced by over-feeding or too rapid drinking. A purgative consisting of 4 to 6 ounces of castor oil will usually correct this condition. In cases where the disease appears to be chronic and is accompanied by wasting, and possibly a cough, the presence of worms is indicated. The treatment for worms is as follows:—Take 4 ounces of bluestone and dissolve completely in 2 gallons of water. To this solution add 4 fluid ounces of Blackleaf 40 (Nicotine Sulphate). Give each affected calf two tablespoonfuls of the mixture at a dose. The treatment may be repeated in a fortnight if required.

The cough referred to as a complaint which may accompany the form of diarrhœa dealt with above is due to lungworms. These are always secondary invaders after the resistance of the calf has been lowered by the effects of bowel worms. Eradication of the latter will enable the animal to rid itself of the lungworms. The treatment also assists in this direction since part of the life history of the lungworm is passed in the bowel, and consequently many worms will be removed before they can locate in the lungs.

Black scour and constant bloating are due, almost always, to the presence of germs in the bowels, which cause excessive fermentation. Treatment which has proved of value in these cases consists of the administration of 20 to 40 drops of Formalin or Lysol, according to age, given in milk once daily for a few days. The treatment should, however, always be preceded by a dose of castor oil.

The foregoing is not a complete list of the diseases to which calves are subject. It does, however, include most of the common ailments which respond to simple remedial measures. While the treatments advocated are effective and easily applied, the fact cannot be over-emphasised that most of the troubles described can be entirely obviated by correct feeding and management.

PREPARATION OF A SEED-BED FOR PASTURE SPECIES

Disappointing results sometimes attend the sowing of grass and clover seeds because insufficient attention has been paid to the preparation of the seed-bed. This may arise from two causes—commencing cultivation too late, or carrying out the initial ploughing under conditions which make difficult the subsequent working of the soil to a sufficiently fine tilth. All the seeds of pasture species are small, and require to be covered very lightly. Further, they must be firmly in contact with the soil, which must be lightly consolidated on the surface. Neither of these essential considerations can obtain in a rough or unduly loose seed-bed. Usually the best and most economic way to obtain a fine and well compacted surface is to plough early and allow weathering influences plenty of time in which to break up the soil and mellow it down. Subsequently, the desired degree of fineness and consolidation can be brought about by harrowing and the use of such an implement as the Cambridge roller.

Extension Service

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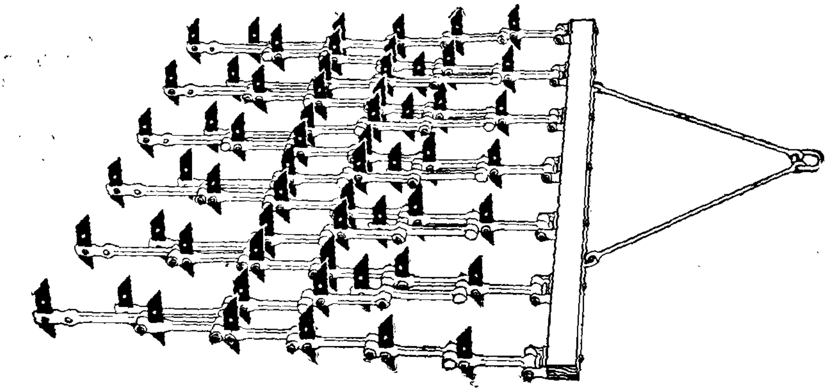

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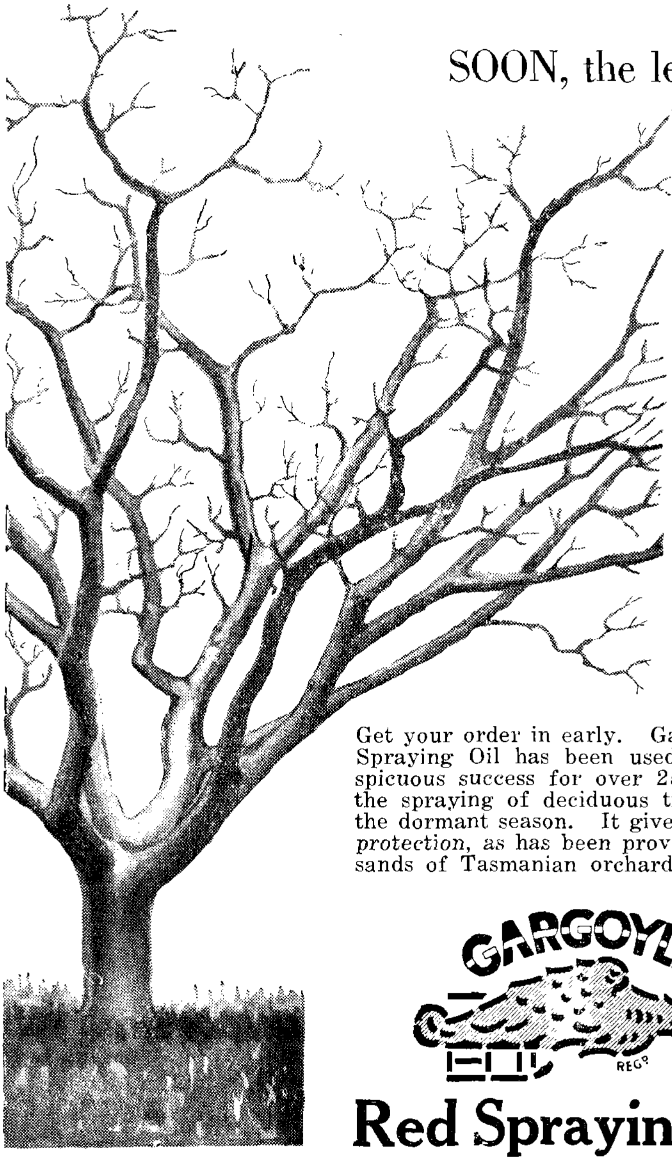

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Fat Lamb Production

The development of the fat lamb industry is receiving special attention. Special arrangements have been made for advances to farmers for the purchase of breeding ewes.

Communicate with the Agricultural Bank or the nearest District Officer of the Agricultural Department for details of scheme.

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Limited funds are available for advances to farmers under "The Unemployed (Assistance to Primary Producers) Relief Act," provided bona fide unemployed persons are engaged in effecting permanent improvements. Loans are free of interest (except where required for building purposes, when 2½ per cent. is charged). Repayment by instalments up to 11½ years, allowing 1½ years before commencement.

Further particulars and application forms obtainable from the Agricultural Bank of Tasmania, Macquarie Street (G.P.O. Box 646 C) Hobart; The Agricultural Department, George Street, Launceston, and from District Agricultural Officers stationed at Devonport, Ulverstone, Burnie, Smithton, Scottsdale and Campbell Town.

Farmers' Debt Adjustment Act

This legislation provides assistance to farmers in adjusting their debts. The Act was recently amended, and particulars of the new conditions will be supplied on application to the Farmers' Debt Adjustment Board, c/o The Agricultural Bank of Tasmania, Macquarie Street (G.P.O. Box 606 E), Hobart, or to any District Officer of the Agricultural Department.

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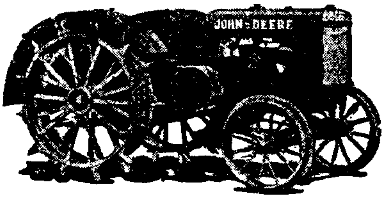

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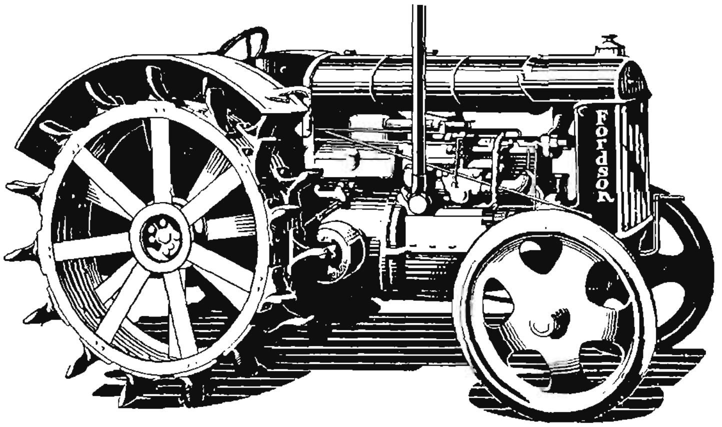

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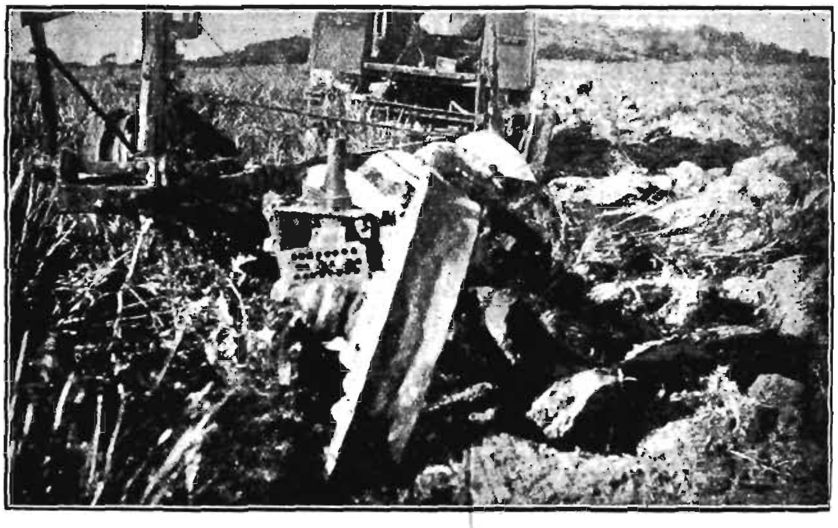

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> **"Dear Sirs,—I have much pleasure in recommending your 'Mitchell' 4-Furrow Disc Yacca Plough. This plough did wonderful work in heavy, saggy and yacca grass tree country. I have just ploughed 80 acres of this country with a McCormick-Deering Tractor at the rate of ONE ACRE PER HOUR, and the tractor made easy work in second gear.**
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> **"Although the plough is 20 ft. long it is very easy to handle, and only leaves a small head-land. This is due to the wonderful Power Lift, which allows the man operating the lift to drop the plough in a fraction of a second. No matter how soft the land may be the Power Lift again enables the operator to keep the Plough at the required depth in soft, boggy country."**

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NUMBER OF FURROWS can easily be reduced or added to, so that you can suit the pulling power you have now or in the future.

HORSE OR TRACTOR PULL. Depth is rope controlled from the tractor, or from the plough seat if horse pulled. No heavy, awkward or dangerous levers.

DRAFT is very light.

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COMMONWEALTH STOCK AND BONDS BOUGHT AND SOLD

FIELD DAY AT THE STRATHROY EXPERIMENTAL AREA

By THE AGRONOMY DIVISION

A FIELD day held at the experimental area on the property of Mr. P. B. Grubb, "Strathroy," on December 10th, was attended by some 150 farmers, who were invited to witness the most recent developments in the plant improvement work which has been in progress on the area since 1933.

During the year work was devoted to the improvement of cereals, peas and pasture plants; projects which were initiated in the first and subsequent years were advanced a stage further, while several new ones were commenced.

Cereal breeding and selection work occupied the greater part of the area, and was confined entirely to hand-sown rows. Trials involving the use of large drilled plots had to be transferred to another area owing to limitation of space. These were conducted on the property of Mr. Trevor Jones, "Douglas Park," Campbell Town, where a number of introduced wheat varieties were under trial in 1/40 acre plots replicated 4 times.

The main work on cereals at "Strathroy" has been the isolation and trial of pure strains of Bræmar Velvet wheat and Tasmanian Algerian oats, and continuation of the wheat breeding programme initiated in 1933.

Selection Work

Wheat.—Bræmar Velvet was at one time the most popular wheat grown in Tasmania. In recent years, however, it has declined considerably in favour owing to the development of inferior strains and other impurities. Despite this, Bræmar still yields well, as evidenced by the fact that many farmers still prefer it to any other wheat. It is a variety worth preserving, not only on account of its high yielding ability, but also because of its excellent milling qualities and the popularity of its flour for biscuit-making. An endeavour is being made to rebuild this variety by single plant selection, and during the season just concluded 30 pure strains, the survivors of some 200 originally selected from a growing crop, were grown in replicated hand-sown rows a quarter of a chain long. The various strains have been closely studied during all stages of growth, and will finally be compared on the basis of yield. Endeavours have been made to find a strain possessing a measure of resistance to Stem Rust and Mildew *(Erisyphe graminis)*, but with no success. Two strains at present appear to be outstanding in yield, one a decided variation in growth form from the characteristic Bræmar type, being more erect in early growth. It is also earlier in maturity by several days.

Algerian Oats.—A considerable degree of degeneration is apparent in our seed stocks of Algerian oats, and efforts along similar lines to those described above are being made to improve the

position. A start was made with this work three years ago, and vast differences were apparent in the various strains isolated. The main differences experienced were concerned with the following characters:—

1. Time of maturity.
2. Effect of grazing.
3. Winter growth.
4. Straw strength.
5. Grain quality.
6. Yields of hay and grain.

It was found that prostrate winter growth was invariably "linked" with late maturity, while a similar "linkage" between erect winter growth and earliness was apparent.

During the past year 104 strains were under test in single rows replicated four times. These represented the best lines surviving from last year's trials. In addition, approximately 100 selections made last harvest from bulk crops were grown and studied.

Selection work is also being carried out with peas, but owing to lack of space only a few lines could be planted out this season.

FARMERS INSPECTING THE WHEAT BREEDING PLOTS

Wheat Cross-Breeding

The main objective of the breeding programme is to improve the yield and disease-resistance of Bræmar Velvet by crossing with varieties in which these characteristics are apparent. A further aim is to produce a high yielding and early maturing variety suitable for spring sowing. Crosses have also been made in an endeavour to produce wheats of improved baking quality.

During the season approximately 1,500 lines of crossbred wheat were under observation, representing some 40 different crosses made during the past four years. Practically all the varieties used for crossing have been introduced from the Mainland, New Zealand and overseas. One of these, the American variety Hope, is almost immune to Stem Rust and is expected to be of great value in breeding for resistance to this disease.

The following varieties have been crossed with selections of Bræmar Velvet, the purpose for which each was chosen being indicated at the head of the respective columns, viz.:—

Early Maturity	Improved Baking Quality	High Yield	Rust Resistance
Gluyas Early	Florence	Major	Hope
Waratah	Hope	Federation	Ford
Ranee 4H	White Fife	Free Gallipoli	Apollo
Nabawa	Cadia	Yandilla King	
Florence	Yeoman	Turvey	
Bobin	Hard Federation	Cleveland	
	Jumbuck	Canimbla	
	Cross 7	Steinwedel	
		Solid Straw Tuscan	
		Squarehead's Master	
		Iron	
		Wilhelmina	
		Yeoman	
		Ranee	
		Dreadnought	
		Velvet	
		Sutton	

Pasture Plant Improvement and Investigation

This work may be considered under three separate headings, namely, grasses, clovers, and mixtures of these two.

Grasses.—Perennial Ryegrass ranks first in importance among the species at present favoured for the establishment of grassland. Consequently, the main activity has been devoted to the building up of a superior strain of ryegrass from plants derived from a large number of sources. Attention during the past year has largely been concentrated on a number of superior plants selected from 5,000 units originally set out for study. In 1935 seed was harvested from some of these selected plants under conditions of open pollination, and seedlings grown this season showed a satisfactory degree of inheritance of leafiness and vigour, and compared favourably with seedlings grown from New Zealand certified and old pasture Tasmanian seed.

The routine testing of seed lines grown in Tasmania for certification was continued by the study of broadcast plots. These plots are subjected to close mowing which causes inferior lines to die out in the second year. Certification would subsequently be withheld in the case of any lines which revealed weakness under this treatment.

SELECTED RYEGRASS PLANTS UNDER TRIAL IN TILLER ROWS

Single plants from standard seed lines are also being studied for seasonal growth, trueness to type, disease-resistance and longevity. Plants obtained from the best Tasmanian lines are included for comparison.

Cocksfoot. — For non-intensive grazing conditions Cocksfoot is generally preferred to Ryegrass. The work in progress on this species is of a similar character to that described above, but has not yet reached the same stage. Single plant analysis and studies of broadcast plots are made as with ryegrass. Close study of plants derived from all sources has revealed a few local strains of considerable promise. Further material has been obtained as a source of additional mother-plants.

Other Species.—Single plant studies on lines of Phalaris Tuberosa and Brown Top indicate the existence of a wide field for improvement work.

Clovers

Up to the present the work on clovers has been confined almost entirely to the testing of strains from different sources. Subterranean Clover has received special attention owing to the number of distinct strains that have appeared in the last few years. Sam-

ples have been obtained from Victoria, South Australia and Western Australia, as well as from various districts in Tasmania.

The varieties which command special interest at present are those which remain green until late in the summer. Varieties exhibiting this characteristic are Bass, Burnerang, Tallarook and Wenigup. The two latter show the most vigorous growth and are expected to be of use in the later districts of the State. Tallarook appears to be hardier than Wenigup, and for this reason should have a wider range of adaptability.

Work on White Clover and Red Clover has been confined to a study of broadcast plots sown down with seed lines of various types and origins. The most noticeable feature of these trials has been the superiority of New Zealand White Clover, which is outstanding in respect to ground cover and productivity. Among the Red Clover strains certified Montgomery is showing a more pronounced growth density and ground cover than the ordinary commercial types.

PLOTS ON WHICH THE SEASONAL PRODUCTION OF VARIOUS PASTURE MIXTURES IS BEING MEASURED

Pasture Mixtures

The seasonal productivity of various pasture species is being studied in small replicated plots, each consisting of one grass in combination with one clover. The main species employed in the trial were various strains of Ryegrass, Cocksfoot and Phalaris Tuberosa in combination with various strains of Subterranean and White Clover. Secondary species used were Timothy, Prairie Grass, Meadow Fescue and Red Fescue. White Clover only was used in combination with each of these latter species.

The object of the trial is to determine the possibility of maintaining a continuous supply of pasturage throughout the year by the separate planting, in different paddocks, of several distinct species overlapping each other in seasonal production.

When a number of species are included in one mixture the tendency is for those which produce early in the season to become dominant, thus inhibiting the growth of the latter species at the season when they should be fully productive. By providing a series of special purpose mixtures, each having an individual uniform growth period, this intensive competition might be avoided and each species enabled to produce up to its maximum capacity.

THE PURCHASE OF PASTURE SEEDS

It is advisable to consider the quality of grass and clover seeds well in advance of sowing time, so that there may be plenty of time in which to select lines of suitable strain and satisfactory purity and germination. The matter of strain will be amply taken care of if certified seeds are purchased. The other qualities, however, can only be ascertained by the consideration of specific facts. Under The Seeds Act every retailer of the principle pasture seeds is required to provide the purchaser with particulars of purity and germination, and farmers are advised to consider these when seeking quotations. The value of any given seed-line depends, in the final analysis, upon the amount of pure living seed it contains—a fact not always taken into account. For example, in considering the relative values of two lines of ryegrass seed, one with a purity of 98% and a germination of 80% (70% of pure living seed) at 9/6 per bushel, and the other a purity of 95% and germination 60% (50% pure living seed) at 8/6, the former represents by far the better purchasing value. By comparison, the price of the second line is too high by 1/6 per bushel.

Such a comparison can, of course, only be made when lines of equivalent quality—apart from purity and germination percentages—are considered. Certified seed, for instance, could not be compared with uncertified on the basis suggested.

Seed-Testing Station

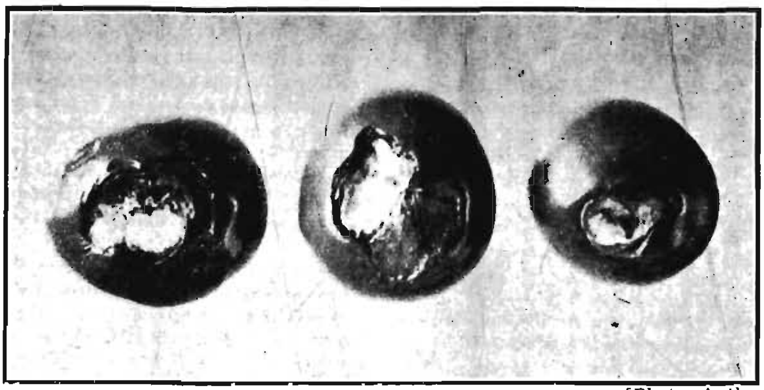
BLOSSOM-END ROT OF TOMATOES

By J. O. HENRICK, Plant Pathologist

DURING the last three or four seasons a number of tomato growers have adopted glass-house culture in order to take advantage of the early market which exists on the Mainland.

Certain difficulties have been experienced owing to the failure of some growers to make adequate allowance for the abnormal conditions which exist under this method of culture as compared with those obtaining in the field. Not only are the plants subjected, in the glass-house, to a totally different environment, but this, combined with intensive cultivation and manuring, tends to produce a forced plant constitutionally weak, and as a result more diseases are to be expected than are known in outdoor crops.

A trouble which has occurred on three known occasions, at the height of the production season, and has caused consternation on account of its widespread nature in the glass-house, is illustrated in the accompanying figure.



[Photo, Author

BLOSSOM-END ROT OF TOMATOES

Fruits centre and right: Affected patch parchment-like, sunken, firm. Fruits firm. Fruit left: Secondary infection, five days after picking. Decay in patch and softening of fruit.

The condition is known as Blossom End Rot, a name derived from the fact that the affected area is always located at the blossom end of the fruit.

Appearance

The area affected is roughly circular, and in the early stages is soft and has a water-soaked appearance. Later it becomes shrunken, firm, parchment-like, and normally of a putty colour. Moulds and secondary organisms may gain an entrance and cause rotting.

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Cause

The trouble is not due to a fungus parasite, but is of physiological origin and is caused by fluctuations in the amount of water supplied to the plant. If watering has been regularly carried out and then, at a period in the growth of the fruit, a sudden shortage of moisture occurs owing to either inadequate supply or high transpiration due to temperature, Blossom End Rot will result.

Shortage of water does not necessarily cause the plant to droop. It is quite possible for it to maintain a perfectly normal appearance while actually the amount of moisture available is insufficient.

The leaves of the plant have a greater osmotic pressure than the fruit, and in the event of inadequate moisture supply, will take up all the water they normally require at the expense of the latter. The fruit cells affected are those farthest from the roots, i.e., those located at the blossom end. The shortage of water results in an acid concentration in the cell sap, which causes the death of the cells and rotting of the area. It will thus be seen why the trouble appears simultaneously throughout the glass-house.

Control

Constant attention should be given to watering, temperature and ventilation. Watering should be carried out regularly and the amount supplied and manner and frequency of application be adapted to the texture of the soil. After each watering, surface cultivation should be carried out in order to ærate the soil, conserve moisture and promote good root growth. Cultivation should be continued for as long as possible in the season.

Thermometers should be installed so that temperature will be accurately gauged and guess-work eliminated. The optimum temperature for plants in the younger stage is 65° Fahr., gradually rising to 75° Fahr. at the fruiting stage.

Methods of ventilation need improving. The system which depends upon removal of side panes does not give satisfactory control and may create draughts. Ridge-pole ventilation gives the best control of temperature.

The occurrence of Blossom End Rot is always a grave possibility in Tasmania in cases where temperature is not carefully controlled. A sudden warm snap lasting for a day, or portion of a day, is frequently experienced during a period of cool weather which requires the temperature in the glass-house to be maintained at a relatively high level. During this short, warm spell the temperature may, if not controlled, rise above 80° Fahr., and conditions are thus created which may quickly cause the damage known as Blossom End Rot.

REFERENCES:

Charles Brooks: Phytopathology, 4, 345-374, 1914.

Charles Chupp: Manurial Vegetable Garden Diseases, 580-583, 1925.

Geoffrey Samuels: Tomato Diseases in South Australia, Bull. 249, 52-54, 1930.

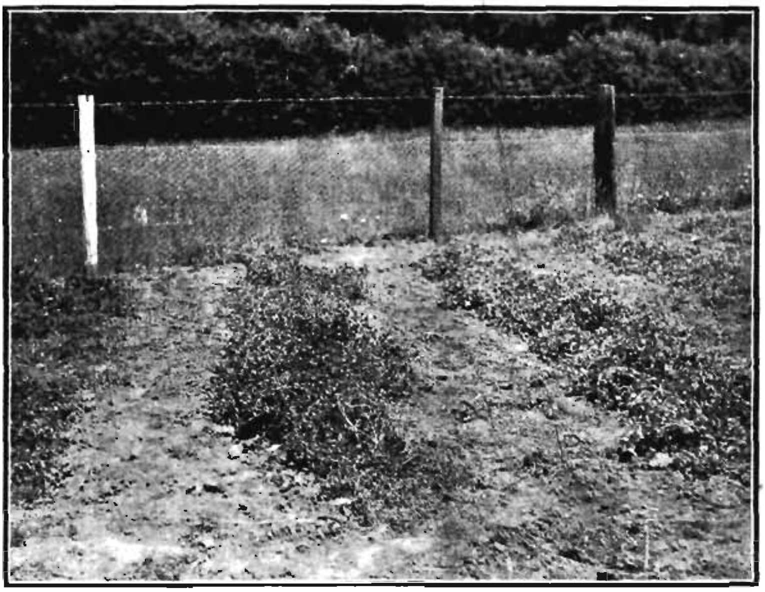
LATE VARIETIES OF SUBTERRANEAN CLOVER

By E. F. FRICKE, Agronomist

TESTS carried out at the "Strathroy" experimental area during the last three years on the various strains of Subterranean Clover isolated in other States, show that the late varieties are the most promising for our conditions.

The earliest work [1] consisted of observations on single plants of all the available strains. Botanical characters were recorded and measurements were made of the seasonal production.

This work has been followed by further single plant study under different seasonal conditions, and by trials involving the use of broadcast plots. As a result the possibilities of the later strains have further been demonstrated and more information has been gained regarding their place in Tasmania.



LATE VARIETIES OF SUBTERRANEAN CLOVER
Wenigup (left) and Tallarook (right) at "Strathroy" in mid-December.

In this State the importance of lateness in habit of growth is threefold. Firstly, a late variety is able to utilise relatively cool, moist conditions by providing late green feed and by producing a heavier yield of seed. Secondly, as pointed out by Harrison,[2] the late varieties do not bury their seed so deeply as the earlier ones, owing to the ground being hard at the time of burying. This enables a greater proportion of the burr to be harvested or to be eaten by stock. Thirdly, the greater density of most late varieties

provides a better smothering effect on the weed growth commonly experienced in the later districts. A further advantage of late strains is their resistance to rust. In some seasons this disease seriously reduces the yield of mid-season type pastures, and in districts of high summer rainfall a rust-resistant variety, especially of a late strain, would be of the greatest value.

Two strains have given outstanding performance in trials at "Strathroy"—Wenigup and Tallarook. Wenigup has given excellent results under good conditions. It requires relatively high rainfall and good soil fertility. The leaves are large and carried on long stalks, which characteristics probably render the variety more suitable for cattle-grazing than for sheep. The seed is produced in Western Australia, but up to the present only small quantities have been obtainable.

Tallarook appears to have a wider range of adaptability than Wenigup. It is hardier, denser, and more capable of withstanding lower fertility and weed competition. Seed is now being produced in commercial quantities, and farmers, particularly those in later districts, are advised to try this strain in place of the ordinary mid-season variety. If seed production is contemplated, the land should be free from other Subterranean Clover and from weeds. A seeding of 4 lbs. per acre with 2 cwt. Superphosphate should produce a satisfactory seed yield in the first season. The seed is produced commercially in Victoria, where, according to Harrison,[3] it occurs naturally in a locality with a 23in. rainfall, but as the land on which it thrives there is probably above the average in moisture retentiveness, a somewhat higher rainfall may be necessary to ensure the full development of this strain under average soil conditions.

The occurrence of regional strains of Subterranean Clover in Tasmania is being investigated, and up to the present no pure types have been discovered. As nearly all the Subterranean Clover in Tasmania has been introduced by sowing down mid-season type seed, the evolution of distinct strains from them would be expected to take a considerable number of years. A sample from Westbury, for instance, has been found to contain a few plants of the Bass type. In time, depending upon the management of the pasture, these plants would be expected to multiply at a greater rate than the mid-season plants, and would eventually predominate. In comparison with Tallarook, Bass is a relatively low producing strain, so the former is preferable.

The possibilities of discovering local strains of seed are greatest where the plant has been established for a number of years. Farmers who possess old paddocks of Subterranean Clover or fields in which the plants remain green until well into December, are asked to advise the Department and to send a sample of the seed.

REFERENCES:

1 Radel, L. H.: Subterranean Clover—Jour. Dept. Agr. Tas., Vol. VI, Part 1, p. 16—1935.

2 Harrison, J. E.: Improving Pastures in Sheep Areas—Jour. Dept. Agr. Vic., Vol XXXIV, Part 7, p. 325—1936.

3 Harrison, J. E.: Tallarook Subterranean Clover—Vol. XXXIV, Part 3, p. 135—1936.

COMMON FARM WEEDS: THEIR CHARACTER AND CONTROL

By R. H. BEVIN, Chief Agronomist

SOUTH AFRICAN ONION WEED (Romulea rosea, syn. bulbocodium)

THIS weed, which belongs to the Iris family, is most commonly found on our poorer country in the low rainfall districts. In appearance it resembles a miniature rush, the leaves being single, bristle-like, and rarely more than four to six inches in height. At the base of the plant is a bulbous "root," similar to that found on the cultivated species of Iris, and it is because of its presence that Onion Weed can become a real menace on cultivated land. The bulb—or corm, as it is more correctly named—acts as a store for reserve plant food, and even though the top foliage may be destroyed fresh growth will rapidly develop from the portion of the plant remaining underground.

South African Onion Weed. (*Romulea rosea syn bulbocodium*).

The flower of Onion Weed has six petals, purple in colour, and is about one half-inch in diameter. After fertilisation a hard seed capsule develops at the end of the flower stalk; this shows later a tendency to grow downwards and become buried in the soil, where the seeds give rise to the next generation of plants. It can be seen, therefore, that the plant perpetuates itself in two ways—first, through the persistence of the corms, and secondly, through the normal process of seed setting and the burial of the seed to ensure its later germination.

Control of Onion Weed must therefore proceed along two main lines. Assuming that the weed has established itself in a paddock, the first concern is to see that it is not allowed to set seed. As the weed is most unpalatable to stock, it does not lend itself to grazing, as is the case with the ordinary run of our common weeds. The best way to prevent seeding is to mow the plant as close to the ground as possible at flowering time—usually about mid-spring or early summer. Mowing should not be delayed or the downward turning tendency of the seed heads will have set in and the seeds will continue on to maturity in the soil. This aspect of the control work is comparatively simple, compared with the elimination of the bulbous roots. If possible, the first attack in this direction should be directed to the lowering of the food supply stored in the corms, and this may be done by winter mowing, which, by constantly defoliating the plant, causes the roots to send up fresh shoots or to provide extra sustenance for replacement of the leaves which have been cut back. This drain on the underground portion of the plant results in the depletion of the vitality of the corms at a time when they would normally be building up their reserve food supplies to carry them over the dormant summer period. Following on mowing, the infected land should be turned over in October and kept worked throughout the summer as is done for the elimination of the common twitches, but in the case of Onion Weed it is most important to keep the soil constantly moving and as moist as possible, as the corms will resist any attempt to germinate them in dry soil.

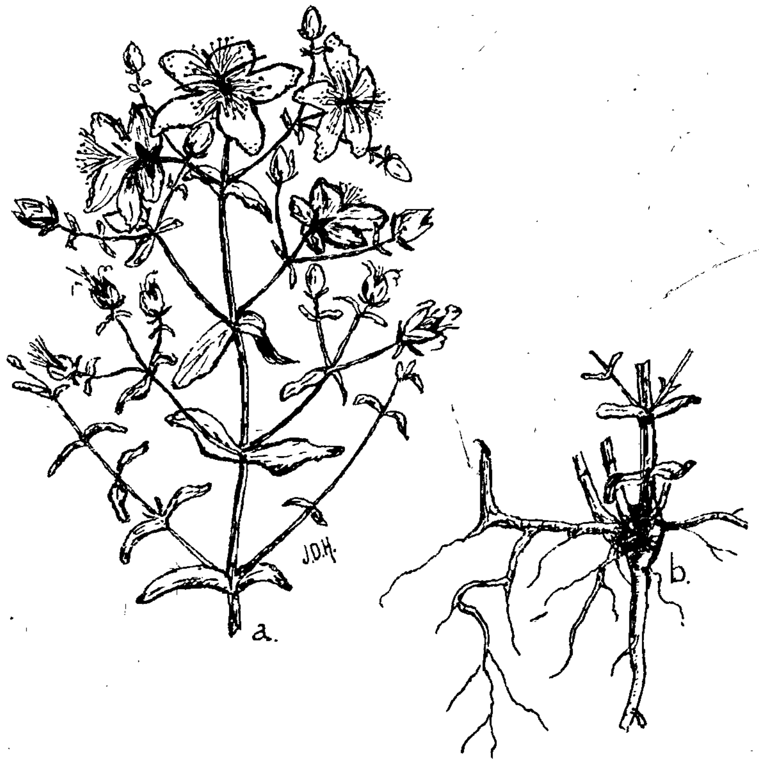
Fortunately, in Tasmania we have not as yet any extensive areas of Onion Weed, but farmers should keep a close watch for its appearance, since once established it will spread quickly, as it has done on many parts of the Mainland, where it is regarded at its true worth as one of the truly noxious weeds in our introduced weed calendar.

ST. JOHN'S WORT (Hypericum perforatum)

Specimens of this weed are received from time to time for identification, and it is considered advisable that a description of its main characteristics should be presented to farmers for their information and as an aid to recognition of the plant which, given the opportunity, can become a real menace, not only on cultivation land but also in pastures, where its unpalatable nature causes it to be neglected and ungrazed, so that it runs freely to seed. Especially on good soil the spread of the plant may be very rapid, and once St. John's Wort has taken charge for a year or two it demands

intensive and prolonged effort on the part of the farmer to eradicate it.

St. John's Wort grows as a small shrub about two feet in height, with dark green leaves arranged in opposite pairs up the stem. The leaves carry definite spotted markings of a lighter colour, due to the presence of oil glands. The flowers, arranged in clusters at the ends of the stems, are yellow in colour, each individual bloom being about half to three-quarters of an inch in diameter. The brownish-purple colouration of the calyx gives a richly decorative appearance which probably at one time or another led to the cultivation of the plant in the garden. The root consists of a main tap which goes down into the soil, and numerous spreading secondary roots which in free soil develop a strongly "twitchy" habit and are definitely perennial in their growth. As a result of this root system, and the setting of seed annually, prolonged summer fallowing, followed, if possible, by the growing of short-rotation root or forage crops for a year or two, provides the most reliable method of control.



St John's Wort. *(Hypericum perforatum).*
a. Flower and seed head. b. Taproot and runners.

At the present time there are no records of St. John's Wort existing in cultivated land to any dangerous extent. But it does occur in one or two of the river beds on the North-West Coast,

and in this type of country it certainly warrants close watching, as the highly fertile basaltic soils and mild climatic conditions would provide excellent conditions for the weed to flourish in profusion.

TUTSAN (Hypericum androsaemum)

This weed, which is closely related to St. John's Wort, has been found on several occasions, mainly on waste land and on roadsides of the North-West. It is similar in appearance to St. John's Wort, but is not considered to be such a serious pest from the general agricultural point of view. The finding of the weed has, however, led to several enquiries regarding its identification, and when it has been located it is advisable to destroy the plants straight away to prevent any possibility of their spreading to assume considerable dimensions.

Identification of Weeds: Forwarding of Specimens

The Department of Agriculture provides free service for farmers in the identification of weeds. Specimens of the whole plant should be forwarded, wrapped in damp blotting or newspaper, to—

Chief Agronomist,
Department of Agriculture,
Launceston.

CROPS FOR ENSILAGE

Silage can be made from any crops which are suitable for feeding to stock as green food. Where possible a legume such as peas, tares or clover, should form a portion of the material in order to balance the feed as much as possible. Such combinations as oats and tares, oats and peas, Italian ryegrass and red clover, etc., are specially suitable.

Any cereal crop will make good silage. Among the spring-sown crops maize and millet are outstanding. Maize, in particular, will give a greater quantity of valuable food per acre than any other crop; yields up to 30 or 40 tons per acre are not uncommon.

While inferior herbage can be used for ensiling, the feed value of the silage is in direct proportion to the quality of the material from which it is made. It is sometimes thought that weeds, especially thistles, make good silage. They can undoubtedly be used, but their feeding values are very low, and the silage made from them cannot be compared with that made from any of the crops mentioned above. Their chief value as silage depends upon the fact that they are converted from unpalatable and more or less inedible rubbish into foodstuffs which, however low their feed values, are readily eaten by stock.

Extension Service

THE BISMARCK POTATO IN TASMANIA

By C. E. W. OLDAKER, Agronomist and Senior Port Inspector

THE early history of the Bismarck potato, which is responsible to-day for an important section of the potato production in Tasmania, is obscure. Moreover, a search of available literature published by other potato-growing countries does not disclose a technical description of any variety possessing the characteristics of the Bismarck; thus it is difficult to determine its source with any degree of certainty. Some years ago, however, a German settler in the South claimed to have been responsible for the introduction, about the year 1880, of a new and vigorous early variety, then known as "Prince Bismarck."

The variety was grown first in high mountainous districts overlooking the Derwent Valley, and production was steadily increased until eventually small consignments were marketed at Hobart. From that centre seed was gradually distributed throughout Southern and South Midland districts, principally to the east of Oatlands.

About 1894 the Bismarck commenced to take a place in the sphere of North-Western production. For several years the variety, including all seed requirements, was grown to a limited extent only and in certain districts immediately on the seafront. During a season in the late 90's, when a comparative yield shortage, accompanied by high market rates, occurred, stocks were so reduced that a number of purchases of so-called "Hobart seed" were made in order to maintain and increase the crop area of what was now recognised as a valuable addition to the varieties already in cultivation. Results obtained from the use of this "seed" produced in high Midland and Southern districts were outstanding, and thus began a trade within the State which has developed through recognised channels into an established and important line of potato production among both highland and coastal growers.

Some forty years ago it was the custom to allow practically the entire potato crop, consisting mainly of late varieties, to remain in the soil until fully matured. Planting was usually carried out during September and October, with variations according to locality and altitude, and harvesting was generally delayed until May of the following year. Except for small lots for local use the lifting of immature tubers was little practised and no development in their marketing and shipment in large quantities had occurred. Since the advent of the Bismarck, however, there has been a noteworthy change in the position, and during recent years an early seasonal trade, devoted to the marketing of immature, or "new," potatoes has taken definite shape under regulatory control. The tendency has been towards earlier, and still earlier, planting and harvesting. In some well-favoured localities close to the North-Western Coast, the seed is turned under from the end of July on-

wards and shipment of the new crop to the Mainland States, commencing shortly after the middle of the following November, has become a regular practice.

Experience gained on the North-West Coast during several seasons towards the close of last century, and arising out of the use of seed introduced directly from the Midlands or the South of the State, made it abundantly clear that the local stocks grown near the seacoast had suffered deterioration in health and productive capacity. The reason for this was not known, although a number of theories were advanced. Probably the most popular was a belief that the potatoes, after being grown under the more severe conditions obtaining in high country, made a vigorous organic response to further propagation in the milder environment of costal districts. "Running out" was accepted as the almost inescapable fate of the Bismarck, as of most other varieties, and although age was viewed as the sole cause it was thought that the very conditions which had, on the first use of the seed, encouraged crop yields, were responsible for an enervating and weakening influence. Various forms of virus infection now classed broadly as "degeneration diseases" were then unrecognised by Tasmanian growers, whose crops suffered severely in localities where mild seasonal conditions prevailed.

Southern seed quickly became accepted as being more profitable than that grown in Northern lowlands, and a regular movement of seed to the North from Southern districts commenced about the year 1897. From a small beginning the peak was reached in 1934, when 50,839 sacks, practically all consigned to destinations on the North-West Coast, went forward. In 1935 an extremely dry season reduced the seed output to less than half that quantity, but high selling rates provided adequate compensation to growers. During the last ten years the total thus disposed of as seed to Coastal farmers engaged in production for the early export trade has aggregated 300,000 sacks. In recent years stocks grown at high altitudes through the hinterland of the North-West are entering strongly into competition for the Coastal trade.

For a number of years the acreage devoted to the Coastal crop for early marketing and export has remained fairly stable, varying between 4,500 and 5,000 acres annually. The two years immediately preceding the current season have established extremes for the last decennial period. In 1935 the total area exceeded 8,000 acres, while in the following year it dropped to approximately 3,500 acres.

The exact plant and tuber type of the "Prince Bismarck" first introduced to Tasmania is a matter of opinion, and, considering the lapse of time, this naturally differs to some extent in detail. However, until an attractive strain now known as the "Silverskin Bismarck" was isolated nine years ago by a progressive Midland grower, the entire production was derived from tubers having a comparatively rugged form with deeply-coloured purple eyes, particularly at the "crown" end. The plant was, moreover, prone to develop that condition which is little understood and given the expressive name of "bolting."

The "Silverskin" quickly won approval from grower, merchant and consumer, and within six years its multiplication was acceler-

ated to such a degree that it displaced the old type which is now practically off the market.

Despite a natural vigour and high productivity under sound farm management and fair seasonal conditions, the Bismarck has a definite weakness in its sensitivity to the influences of environment. A poor soil, an unfavourable season, or a low standard of husbandry is quite sufficient to destroy any hope of a profitable crop. The tendency towards infection by rugose mosaic, which sometimes assumes quite a severe form, and a lack of resistance to blight *(Phytophthera infestans)* may be mentioned amongst other shortcomings. On the other hand, many growers are able to look back with a considerable degree of satisfaction to the profits earned through both the "seed" and early export trades. During the current season some excellent yields have been secured, and cases have been recorded of gross sales amounting to twice, and even three times, the value of the land on which the crop was grown. While some seasons are quite without profit to the grower, the nett result, taken over a term of years, is usually satisfactory. Coming within the writer's memory are many instances of substantial profits from Bismarcks. Two may be quoted by way of illustration. In one instance a small grower received a payment of £60/5/- on account of the sale of two tons delivered early in December, and in the other a farmer in a much larger way was paid considerably over £1,000 for a consignment harvested in one week.

Four years ago the Department of Agriculture acquired a nucleus stock of "Silverskin Bismarcks" for inclusion in potato seed improvement work similar to that being carried out with "Brownells" and other varieties at the Potato Station, Tewkesbury. While much still remains to be done, a distinct forward move has been made in the elimination of "off" type plants. Specialised work, involving single plant selection, multiplication of an approved type, and maintenance of health in isolation, is being carried on. Yield trials designed to compare improved stocks with selections from crops produced by well-known commercial growers are conducted in order to provide some measure of the improvement being achieved, and as soon as circumstances warrant it a select line of "seed" will be brought under the Departmental potato "seed" certification scheme.

SOIL DRAINAGE

IN many of our orchards and farm paddocks a need for improved drainage is apparent. One of the commonest causes of sickly crops and fruit trees is the unhealthy condition brought about by the existence of stagnant water in the soil.

Under such conditions plant life cannot thrive. Badly-drained land is cold and ill-ventilated—two factors which will always militate against successful farming. Extra manuring is futile; the only remedy is drainage — underground tile-drainage for preference.

The benefits to be derived from such treatment are—

(1) The lowering of the water level in the soil. This renders improved cultivation possible and increases the depth to which the roots can penetrate. Reserves of plant food previously untapped are available to the trees or plants, while crops, having a better root-hold, are less liable to be affected by heavy winds and drought.

(2) Excess water is carried off downwards by the drains instead of upwards by evaporation, which is a slow process and keeps the soil cold until late in the spring. Aeration is improved, thus bringing about a healthy condition and encouraging the action of bacteria, which play a vital part in plant growth. The soil is rendered more retentive of water, and nitrogen brought down by rains is readily absorbed.

Wherever crops are stunted and a bad colour, or trees are sickly and unproductive, faulty drainage may be suspected. The growth of rushes, sedges and other water-loving plants on cultivated land, and the tendency of pastures to run to such grasses as Brown Top and Fog, are further indications of excessive moisture.

In the May, 1930, issue of this Journal, an article on the drainage of orchards deals fully with this subject. Readers desiring more detailed information, together with the method of laying underground drains, are referred to this publication.

Agronomy Division

THE VEGETABLE GARDEN

By H. A. TURNER, Horticulturist

FEBRUARY and March are usually the driest months of the year, and at this period regular watering and hoeing of all garden crops is essential. A common mistake in the use of water is its too frequent application. Repeated light watering, unless followed by cultivation, has a decided tendency to harden the surface soil and to encourage surface rooting. On the other hand, a good soaking at weekly, or longer, intervals, and stirring of the surface soil as soon as it is sufficiently dry, will encourage deep rooting and be more beneficial in every way than repeated light sprinkling.

Apart from the routine of cultivation and watering, the most important work in the vegetable garden at the present time is to complete the planting out of vegetables for use during the winter and early spring months. In many gardens cauliflowers will be already established, but if strong plants are available they may still be planted with a reasonable chance of success. Savoy cabbages, broccoli, Brussels sprouts and leeks should be planted out without delay.

A winter vegetable that should not be overlooked is spinach. It is not difficult to grow, is very productive, and possesses valuable health properties. The prickly variety is the best for late summer and autumn sowing. March is about the right time to make the first seeding, but to ensure a continuous supply it is worth while to make several small sowings at intervals of three or four weeks. In the home garden spinach does best if the plants are thinned out to stand eight or nine inches apart. When ready, the larger leaves are taken off for use and the plants left to produce more. In the market garden thinning is usually dispensed with as the entire plants are pulled when ready and made up in bunches.

Tomatoes will be ripening rapidly and water can be used freely, particularly where the fruit is inclined to be small. Tree types that have been grown on stakes will repay present attention to hoeing and watering by continuing to fruit until late autumn.

The various "wilts" and diseases of tomatoes appear to have been more than usually troublesome this year. While the tomato plant is subject to a number of fungus diseases, much of the trouble experienced at the beginning of the season is traceable to premature planting out in the open. The disadvantages of too early planting have been mentioned previously in these pages, but the point is of sufficient importance to justify repetition. The tomato is a semi-tropical plant requiring a certain degree of warmth before it can make satisfactory growth. If planted outside, under the cold and wet conditions which often prevail in this State in the early spring months, the plants may receive a severe check from which they will recover slowly, if at all. Under these conditions the plants will be sickly in colour and stunted in appearance.

The condition commonly referred to as "wilting" appears to be due in most instances to the invasion of the plant tissues by a fungus known as Fusarium, hence the disease is often referred to as "Fusarium Wilt." "Spotted Wilt," a virus disease of tomatoes, also occurs in the State, but not very commonly. There is no remedy applicable to tomato plants which have become infected with a wilt. The best course is to pull them out and burn them, thus lessening the risk of spreading the disease. It is possible, however, to guard against both Fusarium and Spotted Wilt by the adoption of appropriate preventive measures. In the case of the former, spraying with Bordeaux Mixture is the standard remedy. Spotted Wilt being a virus disease, transmitted by insects, the only effective prevention lies in the use of an insecticide spray which will destroy thrips and other carriers of the disease.

Perhaps the most effective means of keeping tomato plants healthy throughout the bearing season is the adoption of crop rotation. The necessity for this is too often overlooked, and it seems likely that the decreasing yields referred to by some growers, together with the greater tendency to diseases and pests, are largely due to the continuous growing of this crop, or allied crops such as potatoes, on the same ground. Where only a limited space is available for gardening purposes, the arrangement of a satisfactory system of crop rotation admittedly presents a difficulty; nevertheless, every endeavour should be made to avoid the growing of tomatoes more often than once in four years on the same patch of ground.

Discussion frequently centres around the question as to whether the saving of his own seed is justifiable on the part of the home gardener. In cases where only a few sixpenny packets are required for the season, the trouble involved is probably disproportionate to the advantages obtained, but under certain circumstances the saving of seed is well worth while. In the last issue of this Journal the wisdom of obtaining seed from disease-free beans was mentioned. It is a fact, well known to most gardeners, that the dwarf or French type of bean is susceptible to one seed-borne disease at least which has become so common in some of the best varieties—Canadian Wonder, for instance—that healthy seed is now almost unprocurable. This is an instance where the saving of seed would be fully justified, and any grower who has a healthy crop of these beans would certainly be well advised to let a few plants mature seed.

A possibility which might be exploited to advantage by any home gardener is the selection of improved strains of good vegetable varieties. Any person who possesses insight, perseverance and enthusiasm can obtain superior seed by marking a few of the finest plants at the beginning of the harvesting season and allowing them to come to full maturity.

In making a selection of plants for seed purposes, no matter what kind of vegetable may be involved, it is best to choose those alike in varietal character, vigour and health.

Some vegetables, particularly members of the cabbage family, will cross-pollinate very freely if two varieties are seeded in the one garden, and the saving of seed under such circumstances would be an uncertain venture best left alone.

ABORTION-FREE HERDS

The following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Owner	Address	No. of Cows
Reynolds, H. B.	Relbia	19
Archer, C. A.	Calder	8
Foster, R. J. L.	Evandale	76
Jessup, H. J.	Scottsdale	48
Coombe, B. R., and Bedlington, W. C.	Forth	56
Mervyn Bræ Stud	Scottsdale	35
Ashley Home for Boys	Deloraine	31
Steel, L. J.	Falmouth	176
Lansdell, Mrs. E.	Bracknell	24
Heazlewood, H. R.	Whitemore	11
Hiscutt, J.	Howth	62
Gladman Bros.	Carrick	26
Fisher, J. E.	Oatlands	19
Barnett, D. G.	Edith Creek	19
Beveridge, H. C., and Sons	Latrobe	39
Ollington, W. L.	Forest	23
Midgley, A.	Penguin	27
Fahey, Mrs. J.	Lileah	6
Spinks, K.	Lileah	5
Griffin, J. R.	Gunn's Plains	28
Relbia Farm and Dairy Co.	Relbia	84
Fergusson, F. C.	Penna	50
Lambert, J. D.	Latrobe	28
Edwards, J. C.	Derby	34
Richardson, A. J., and Sons	Chudleigh	28
Heazlewood, T. A.	Hagley	15
Bovill, H. Y.	Devonport	48
Green, S. G.	Penquite	45
Geale, G.	Jetsonville	31
Reed, G. E.	Berriedale	33
Scott, H. Barclay	Whitemore	55
Roebusk, N.	Native Plains	60
Johnson, J. F. and G. M. L	St. Helens	10
Briggs, A. H.	Scottsdale	32
Briggs, C. H.	Scottsdale	38
Stancombe, A. J.	Western Jnc.	40
Perkins, V.	Latrobe	72
Wells, H. Lucadou	Carrick	53
Thompson, J. H. (Estate)	Flinders Island	116
Hall, E. G.	Alanvale	97
Stuart, L. A.	Whitemore	57
Heazlewood, R. K.	Whitemore	34
Sadler, B. T.	East Devonport	140
Ranson, F. W.	Derby	51
Priestley, T. R.	North Scottsdale	53
Robotham, H. V.	Ridgley	27
Badcock, Mrs. F. R., and Sons	Whitemore	19
Badcock, B. M.	Whitemore	23
Hingston, S. J.	Whitemore	18
Cowie, A. E.	Flowery Gully	76
Beardwood, T. J.	Prospect	3
Gardner, H. R., and Sons	Relbia	189
Loosmore, T. C.	Scottsdale	25
Salier, H. G.	Scottsdale	14
Taylor, M. K.	Brighton	37
Jessup, A. V.	Springfield	22
Smith, E. J.	Springfield	35
Badcock, L. A.	Whitemore	18
Haines, H. C.	Ringarooma	39
Williams, J. H.	Springfield	18
Hookway, H. H.	Scottsdale	43
Wells, J. L.	Mt. Hicks	17
Treloggen, J. W.	St. Helens	137
Treloggen, D.	St. Helens	52

CHILD WELFARE NOTES

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

SUMMER DIARRHOEA

INFANTILE diarrhœa is one of the most serious diseases to which babies are prone. It tends to attack infants which are not in full health, but babies who are perfectly well may fall victims to it. The disease is most prevalent in very hot weather, and bottle-fed infants are more susceptible than those which are breast-fed. Among the latter, as well as babies fed on properly prepared humanised milk, appropriate treatment, if applied promptly, is quickly effective. On the other hand, there is a definite possibility of fatal consequences or lasting debility resulting from the adoption of incorrect feeding. To safeguard baby from this risk see that he has everything necessary for good health—fresh air, good food, and sufficient exercise, rest and sleep, etc. Do not let baby be sacrified by giving him improper or germ-contaminated food. If he has to be artificially fed, humanised milk is the best substitute for mother's milk, but the utmost care must be observed with regard to its preparation and to the care of feeding utensils.

Making and Keeping Humanised Milk in Hot Weather

After boiling, the milk mixture must be cooled rapidly to a temperature below 60° Fahr. if possible. Cover the jug loosely with damp butter-muslin and stand in running water, or, if this is not possible, see that the water is frequently changed. Select the shadiest, draughtiest and cleanest place for the milk safe, and in it keep the jug of cooled milk, which should stand in a shallow dish of the coolest water available. Allow the muslin to dip into the water all round, so that it is kept constantly damp. By this means the milk will remain reasonably cool.

Cleanliness

Particular care must be given to ensure scrupulous cleanliness of all utensils during hot weather. Billies, jugs, bottles and teats must be washed absolutely free of all traces of stale milk, the merest trace of which will render a day's supply of fresh milk poisonous. Vessels which have contained milk should always be washed first in cold water and then in hot soapy water. If the first rinsing in cold water is neglected and hot water only used, a film of milk will be deposited on the utensil, which is extremely difficult to remove.

BEWARE OF FLIES—keep everything under cover. Remove soiled napkins at once, and cover them. After changing baby, wash the hands thoroughly before again handling him or his food. Wash the nipples carefully before nursing baby. Be extra careful to ensure regularity of the bowels. See that the baby has freedom of movement in the open air as much as possible. Finally,

do not worry unduly, but be ever on the watch for warning symptoms of trouble, and ready to take prompt measures.

Treatment of a Threatened Attack

If baby's motion appears green, the mother should be on her guard at once and should carefully observe the next motion. Should there also be some partly digested food in the motions, this is a sign that the digestion has been overtaxed in some way. The food should be diluted for a time, and worked up to full strength again gradually.

A slightly greenish stool does not necessarily mean that an attack of diarrhœa is threatened, but if such a condition persists and the motions are becoming more relaxed, frequently passed and offensive, the mother should at once proceed as follows, irrespective of whether the baby is breast or bottle-fed:—

1. Give a dose of castor oil, one or two teaspoonfuls according to age. The average dose for a normal baby in his first year is an ordinary teaspoonful (not an afternoon teaspoon), but a very small, delicate baby may need slightly less.
2. Give boiled water only for the next two or three feeds at least.

Should the baby be breast-fed the mother must draw off the milk from her breasts at the usual time for feeding, either by expressing with the finger or by the use of the breast pump.

Should the frequent passing of green motions persist and baby appear to be getting worse, continue to give boiled water only, and call in the doctor. Should there be improvement, however, as the result of the above treatment, proceed as follows:—

1. In the case of a breast-fed baby, give a few ounces of boiled water immediately before nursing, and allow baby to suckle for a few minutes only. At the next feeding give rather less water and allow a slightly longer period at the breast. At each subsequent feed the amount of water can be reduced a little and the suckling period extended proportionately. It may be necessary to allow several days, or a week or more, to elapse before the resumption of normal feeding.
2. For the bottle-fed baby, proceed according to the following instructions:—At the first feeding after the period of boiled water, give 1 part of humanised milk to 4 parts of boiled water. For the next two or three feedings 1 part of milk can be given with 3 parts of water. If all is now going well and the motions are normal, continue with the diluted humanised milk, gradually grading back to the full-strength mixture. Following on an attack of diarrhœa the humanised milk should, at its first introduction, be boiled for 20 minutes. On recovery, the time of boiling can be reduced by a minute or two daily until the normal method of preparation is resumed.

Fat (usually given in the form of Kariol) is not well taken during an attack of diarrhœa, and if given too soon after even a slight attack, or in too great a quantity, may cause further trouble. The use of the emulsion should be resumed by starting with one teaspoonful in 24 hours and increasing the amount by half a teaspoonful a day until full strength is once more reached. Procedure in this respect should be guided by the state of baby's motions and his general condition.

Fruit juice should be discontinued during an attack, but, if all goes well, can be reintroduced gradually as soon as the motions have remained normal for a few days.

Though normal feeding can be resumed earlier than is indicated above, it is always safer to err on the side of excessive care than to risk a relapse by advancing too quickly.

Older Children

Older children who are threatened with diarrhœa should be treated along the same lines as those described above. Give a dose of castor oil and nothing but water for 12 or 24 hours. Then give boiled milk diluted with rice-water for two or three meals. Work gradually back to full diet by means of simple, easily digested food. Remember, imagination and commonsense are necessary in this, as in everything connected with the care of babies.

A PAGE FOR THE COOK

By A. C. IRVINE, Mistress Domestic Science, Education Department

PUDDINGS

BLANC MANGE

1 pint milk
1 oz. sugar
¼ teaspoon salt
1 egg (if liked)
6 drops essence
2 ozs. cornflour
1 teaspoon butter

(1) Put milk and butter on to boil. (2) Mix cornflour, sugar and salt with a little extra milk till smooth. (3) Pour this into the milk and stir well till boiling. (4) Cook 2 minutes, then add essence and beaten egg, if liked. (4) Pour into a wet mould.

BLANC MANGE VICTORIA

1 pint jelly
Blanc mange

(1) Make blanc mange and pour into a pretty glass dish and let get quite cold. (2) Make jelly from 1 pint packet jelly crystals and pour over blanc mange. (3) When set, decorate with whipped, flavoured, sweetened cream.

SAGO PLUM PUDDING

1 cup breadcrumbs
½ oz. butter
¾ cup milk
3 ozs. sugar
½ teaspoon soda
½ teaspoon essence
¼ teaspoon salt
4 ozs. sago
1 cup raisins

(1) Wash sago and soak all night in the milk. (2) Wash and stone raisins and add with all the other ingredients. (3) Pour into greased mould and steam 3 hours with greased paper on top.

BAKED APPLE SPONGE

6 apples
2 ozs. sugar
6 drops essence of lemon
Little nutmeg
1 pint water
6 ozs. flour
¼ teaspoon salt
1 teaspoon baking powder
1 egg
2 ozs. butter
1½ gills milk
3 ozs. sugar

(1) Peel and core apples and cut up and put them on to stew with sugar, nutmeg, essence of lemon and water. (2) When about half cooked put them into a large, greased pie-dish and cool. (3) Sift flour, salt and baking powder. (4) Rub in butter to flour with the sugar. (5) Beat egg and mix with the milk. (6) Add egg and milk to the flour, etc. (7) Pour this over the apples and bake 1 hour in a moderate oven.

N.B.—This may be made in the same way with any other kind of fruit.

QUEEN PUDDING

2 ozs. stale cake crumbs
2 eggs
Essence
Jam
1 oz. sugar
¼ teaspoon salt
1 pint milk

(1) Put cake crumbs into a greased pie-dish. (2) Beat egg yolks only, with sugar, salt and essence. (3) Add milk to egg yolks and pour over the crumbs. (4) Bake in a dish of water till set. (5) Spread with jam. (6) Beat egg whites to a very stiff froth and spread over the jam. (7) Stand pudding in a cool oven to set the whites a pale amber colour.

BAKED APPLES

Apples	Sugar
Cloves	Water (1 gill)

(1) Wash and dry apples. (2) core them and fill with sugar, one clove and a small piece of butter. (3) Bake in a dish with the water for 1 hour.

LEMON SAGO

3 ozs. sago	¼ teaspoon salt
1 pint water	1 tablespoon treacle
Juice of 1 lemon	3 ozs. sugar
Rind of 1 lemon	

(1) Wash sago and put into a saucepan with water and salt. (2) Stir till boiling and cook till sago is clear. (3) Add all other ingredients and pour into a dish. (4) Serve with cream or custard.

BAKED RICE

2 ozs. rice	¼ teaspoon salt
1¼ pints milk	1 oz. sugar
Nutmeg	

(1) Wash rice and put into a greased pie-dish with all other ingredients. (2) Stand pie-dish in oven for 2 hours, cooking very slowly.

STEWED PRUNES (or any dried fruit)

½ lb. prunes	Rind and juice of half a lemon
1 pint water	½ oz. sugar

(1) Wash prunes and put on to stew for 1½ hours with all the other ingredients. (2) They are nice done in a casserole. (3) Dried apricots or peaches do not require lemon.

COFFEE OR CHOCOLATE CUSTARD

6 ozs. stale sponge cake	1 oz. sugar
1¼ pints milk	¼ teaspoon salt
1½ tablespoons coffee essence or chocolate or cocoa	Essence of vanilla
2 eggs	1½ ozs. cocoanut
½ oz. maizena	Whipped Cream
	½ gill sherry

(1) Break up sponge cake into a dish and pour the sherry over it. (2) Put milk on to boil. (3) Mix maizena, sugar and salt with a little cold water till smooth and break in the eggs and beat well. (4) Add coffee essence or cocoa and mix well and stir into the milk till boiling. (5) Pour over the sponge cake and when cold, sprinkle cocoanut on top and serve with whipped cream.

PANCAKES

4 ozs. flour	1 egg
½ teaspoon salt	½ pint milk
1 oz. butter	1 lemon
Sugar	

(1) Sift flour and salt. (2) Make a hole in middle of flour. (3) Break in the egg and mix in a little of the flour to the egg with a wooden spoon and a little of the milk. (4) Keep on doing this till ALL the flour is worked in and only HALF the milk. (5) Beat for 5 minutes, then add the rest of the milk and mix well. (6) Put a little of the butter in a small pan and pour in 4 tablespoons of the batter (or more if the pan is not small) and cook till brown underneath and set all over. (7) Turn and brown the other side and slip onto a hot dish. (8) Sprinkle with lemon juice and sugar and roll up. (9) Serve with a slice of lemon and sugar.

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Editorial

CONTAGIOUS ABORTION IN DAIRY CATTLE

CONTAGIOUS ABORTION has been a source of considerable loss to a number of dairymen and breeders of dairy stock throughout Tasmania, and the presence of the disease in herds has often constituted a serious limiting factor in production. The fact that an animal carrying infection shows no symptoms until an abortion occurs, and the potentialities which thus exist for widespread infection of a herd through the medium of stock introduced from outside sources, render the disease a particularly menacing and insidious one. A single cow aborting may not cause the owner to suspect that the trouble has its origin in an infectious source. Abortions take place from time to time as the result of injury or other causes, and the herd owner who is ignorant of the existence of an abortion-producing organism, or is unsuspecting as to its possible presence in his cattle, might easily regard an isolated case as the effect of accident. Neglect to isolate or destroy the affected animal would eventually lead to the communication of the disease to other members of the herd, and the employment of drastic measures for eradication would then become necessary.

The scheme of abortion-free herd accreditation which has been instituted by the Department of Agriculture through the Animal Health Service is a move which has been welcomed by owners of dairy herds. For a number of years the position has been such as to cause considerable anxiety among dairymen and herd societies, as well as Departmental officers. The disease was known to be firmly established in several large herds, and its eradication presented a problem. How bad the position was can be gauged from

the following figures supplied by the Chief Veterinary Officer from records compiled during 1935-1936.

Among 52 herds supplying milk to the City of Launceston, eight were found to contain cows which reacted to the blood test employed for the detection of the organism responsible for the disease. Among those eight infected herds 23 reacting animals were found and disposed of for slaughter at the abattoirs. Outside of Launceston 105 herds comprising 4,006 animals were tested and 35 herds were found to be infected—half seriously, the remainder more or less slightly. In all, 372 reacting cows—representing 9.2 per cent. of the total number tested—were found. In one badly infected herd no less than 151 out of a total of 403 animals were infected and had to be destroyed.

The necessity for cleaning up these herds will readily be appreciated. Not only was the presence of the disease a source of loss to the owners, but the herds themselves represented a potential menace to the dairying interests of the State. Movements of stock from herd to herd, and from centre to centre, must inevitably have resulted in a wider distribution of infection, and increasing contamination of clean herds. Such movements have, in the past, undoubtedly contributed to the growth and spread of the disease in Tasmania.

Apart from the question of the transfer of dairy stock from one herd to another, a serious source of contamination is that which exists on large agistment areas where cattle representing a number of different herds are permitted to intermingle without restriction. Herds which are allowed to range on this principle would not, of course, be eligible for accreditation; but so long as this system exists it will be difficult to eliminate contagious abortion in the State. A further influence, comparable with the agistment principle in the risk which it involves of widespread communication of disease, is the free ranging of cattle on roadsides and other common grazing areas which is still permitted in certain municipalities. The difficulty presented by these roaming cattle could easily be overcome by the refusal of the local authority to grant licenses to the owners of untested herds, and it is believed that such action is already contemplated by some Councils.

The scheme of herd accreditation has an entirely voluntary basis, and details concerning its operation will be found in another part of this issue. Briefly, the system is based on the submission of herds to blood tests carried out by officers of the Animal Health Service. Any animals which react to the test, thus indicating the presence of infection, must be immediately removed from the herd and effectively isolated; such isolation is only permitted when, in

the opinion of the veterinary officer in charge of the herd, facilities exist for the adequate and safe handling of two separate herds. In all other cases the infected cattle are required to be culled for slaughter. Needless to say, the number of cases in which isolation can be resorted to is small. In practically every instance infected stock have to be destroyed.

Evidence of the popularity of the scheme is afforded by the large and increasing number of herds entered for accreditation. The latest list of certified herds comprises 76 units, and 43 others are now under test. The significance of this wide support for the scheme will at once be apparent. Those herd owners who appreciate the seriousness of the disease, and who are prepared to exercise some pains to keep their cattle free from contamination will now be able to look with confidence to the certified herds for any new stock they require. Further, it is almost certain that a large number of herd owners at present outside the scheme will be compelled, by their inability to compete with the certified herds, to seek membership. Thus the scheme might reasonably be expected to accumulate more and more impetus until it embraces a sufficient number of herds to bring effective State-wide control within sight.

An aspect of the situation which reflects the greatest credit on owners of infected herds, while at the same time indicating the seriousness with which they regard the prevalence of the disease, is the readiness which they have displayed in complying with the most drastic requirements of the scheme. Many animals have had to be destroyed without any compensation whatever, and this has, in some cases, imposed a severe loss. It has, however, been clearly realised that such a loss is inevitable, and well worth while if it is the means of permanently rectifying the position. Latterly, compensation has been paid in respect of animals which have had to be destroyed, and this will undoubtedly cause a number of dairymen who have, up to the present, refrained from seeking accreditation on account of the possible loss involved, to come into the scheme.

Considerable credit must also be given to the various herd societies for the support which they have given to the scheme. Much of the impetus which the movement has received has resulted from their enthusiasm and the unhesitating readiness of their members to further the work of the veterinary staff in every way.

The certified herds are at present somewhat scattered, and there is no systematic linking up of farm with farm and district with district. Future objectives, however, embrace such a development. With increasing facilities it is intended to work systematically, first for clean farms, then for clean districts, and finally,

for clean municipalities. When all these objectives have been achieved it is possible that some legislative action may be sought to control the movements of infected cattle. By such means it would be possible to confine any outbreaks of the disease to the centres in which they existed. Already cattle entering Tasmania are required to be tested before they leave the exporting State, and to be accompanied by a certificate indicating that they have passed the contagious abortion test. This action confines the amount of disease which has to be contended with to that which now exists within the State, and limits the possibility of fresh centres of infection arising in areas where attempts are being made to clean up the trouble.

While the complete elimination of the disease from the herds of the State may at present seem far off, its accomplishment could be brought about more easily and cheaply in Tasmania than in any other State of the Commonwealth. The freedom from State boundaries and the smaller number of cattle in the Island constitute a very great advantage in the elimination of this, as well as of any other, contagious stock disease.

NOTES ON FRUIT FLIES AND SOME OTHER INSECT PESTS AT PRESENT UNESTABLISHED IN TASMANIA

By J. W. EVANS, Entomologist

Introduction

AT THE present time there are over a hundred species of insects in Tasmania that may be regarded as pests, either of agricultural crops, pastures, stored products, fruit trees, or of domestic animals. Of these approximately seventy-five per cent. are not indigenous to this country, but have been brought here since the advent of our race. In addition to insects, about a dozen species of mites established in Tasmania can be included under the category of pests. All of these have been introduced. Had an efficient quarantine service been operating from the commencement of settlement it is probable that a certain proportion of these pests would have been excluded from the State. No quarantine service can be expected to function with complete success, and, although of recent years fresh introductions of destructive insects into Australia and New Zealand have been few, they have occurred, and will doubtless do so in the future. A well-organised quarantine service, whilst powerless to prevent the entry of all pests, can diminish very greatly the chances of insects obtaining a foothold in a country, and by so doing help postpone their establishment. The value of this postponement is great since each year additional knowledge concerning insect control is being made available, and an insect which to-day is regarded as a potential danger may, in twenty years' time, present no menace.

Fruit Flies

From time to time articles appear in the local press drawing attention to the menace of fruit flies to the Tasmanian apple industry. The authors of these articles base their assertions on no data, and such arguments as they may bring forward to support their opinions are invariably erroneous.

Whilst it is impossible to state definitely that fruit flies could never become established in Tasmania, it is maintained that their permanent establishment in this State is improbable, and that even if they did succeed in obtaining a footing, the damage caused by them would, in most seasons, be relatively unimportant.

Of the many species of fruit flies which occur on the mainland of Australia only two are serious pests; these are the introduced Mediterranean Fruit Fly (*Ceratitis capitata*) and the Queensland Fruit Fly (*Dacus ferrugineus*). Both species can breed in a wide range of fruits; in fact, it is probable that practically every kind of fruit is in some degree susceptible to attack.

The flies lay their eggs on ripening fruit; these hatch and give rise to maggots that feed on the inside tissues and when full fed, fall to the ground, enter the soil and transform into pupæ. From the pupæ flies eventually emerge.

Insect activities are intimately bound up with climatic factors, of which the most important are temperature and humidity. Every insect has a definite climatic range; it may be a wide one, enabling a particular species to live with equal facility in temperate or tropical regions, or it may be a narrow one, confining it to a zone of very limited extent. Bordering on a zone of optimum conditions, most favourable to an insect's activities, are less favourable zones defined principally by changes in climatic conditions.

If an insect is liberated in a new country, one of two things will happen. If suitable food is available and the climate favourable, establishment will follow, the eventual abundance of the insect depending on the degree to which the new environment proves congenial and the extent of the control exerted by other organisms. If, on the other hand, suitable food is not available, or the climate adverse, the insect will not succeed in reproducing and will die. There is no question of its changing its habits or becoming "acclimatized."

Mediterranean Fruit Fly

The Mediterranean Fruit Fly has been intensively studied, hence a consideration of some of the known facts concerned with its activities in relationship to temperature, combined with those relating to its present distribution in Australia, will afford some basis for the estimation of its chances of becoming established in Tasmania as a permanent pest.

It will be appreciated that this insect could not become permanently established unless able to survive as an adult fly or pupa during those months of the year when ripening fruit is not available. It is well known that adult flies are not a factor in carrying the species through adverse climatic conditions, and even though flies unable to find fruit in which to lay eggs will live longer than those that have oviposited, it is unlikely that they could survive a period of from six to eight months. An extensive series of experiments carried out some years ago in Hawaii with pupæ held at various temperatures, revealed that heat ranging from 58° to 68° Fahr. has no detrimental effect upon development; that little or no development takes place at 50°, and that mortality occurs below this temperature if exposures are continued sufficiently long. From some forty thousand pupæ of various ages kept at a temperature ranging from 49° to 51° Fahr. for two months, no flies emerged, and on the evidence of this and other experiments it was concluded that the Mediterranean Fruit Fly could not become a serious pest in climates where the mean temperature is below 50° for periods covering three months of the year.

Before proceeding to discuss the present distribution of this insect in Australia, attention is drawn to the fact that the average

mean temperatures at Hobart for the months of June, July and August are less than 50° Fahr., and less than 51° for May and September.

On the mainland of Australia the fly is established in two States —New South Wales and Western Australia. In New South Wales it occurs most abundantly at Sydney and in the counties of Cork, Northumberland and Cumberland, but its distribution does not extend north of Newcastle. In Western Australia it is distributed along a coastal belt some forty to sixty miles wide, reaching from Geraldton in the North to Busselton in the South. The average mean temperatures at Sydney for the months of May to August inclusive, are 58.9°, 54.7°, 52.9° and 55.7° Fahr., and for Bunbury, which lies in the extreme South of the permanent Western Australian fruit fly belt, 59.5°, 56.4°, 54.8° and 55.4° Fahr.

Queensland Fruit Fly

The Queensland Fruit Fly is an indigenous insect. It occurs in Queensland and in several localities in New South Wales, especially along the coastal belt to about fifty miles south of Sydney. The fact that it causes injury to apples at both Goulburn in New South Wales, and Stanthorpe in Queensland, where the winter temperatures are lower than at Hobart, has led many to believe that it could also flourish in Tasmania.

Unfortunately, no detailed studies have been made to determine the relationship of the activities of this fly with climatic factors, but all the available evidence indicates that it cannot survive the winter in these districts, and that re-infestations take place each year as a result of the migration of the flies in early summer from nearby districts enjoying a warmer climate. At both Goulburn and Stanthorpe the summer temperatures are very much higher than those of the Tasmanian fruit-growing districts, and enable the pest to reach a much greater level of abundance in a short period than would be possible in Tasmania.

Potential Insect Pests

Whilst it is desirable that reasonable steps be taken to exclude fruit flies from Tasmania, other pests occur in Australia and New Zealand which present a much more real menace to Tasmanian agriculture. Amongst these are the Oriental Peach Moth *(Cydia molesta)*, the Cabbage Butterfly *(Pieris rapae)* and the Red-Legged Earth Mite *(Halotydeus destructor)*.

Peach Moth

The Peach Moth is an introduced insect, and now occurs in several localities in Victoria and New South Wales. The caterpillars destroy the growing shoots of both peach and nectarine trees and also the fruit, which they enter in a similar manner to the Codlin Moth in apples. So serious is the injury that the very existence of the peach-growing industry in certain districts in Victoria is threatened. In one important centre last season as

much as half of the crop was destroyed. No satisfactory means of control for this pest have yet been discovered, hence it is essential that every effort be made to prevent its entry into Tasmania.

Cabbage Butterfly

This butterfly is a native of Europe, and is a pest of all cruciferous crops, especially cabbages. It was introduced into Eastern North America in 1858, and reached California in 1883. Later it extended its range to Hawaii, and spread from there to New Zealand, which it reached in 1930. Unless a careful watch is kept for it, it may become established in Tasmania, transported with cargo from New Zealand. The butterfly itself is white in colour, the outer surface of the wings being suffused with yellow and the inner surface having one or two black spots on the front wings. The caterpillars are velvety-green in colour.

Red-Legged Earth Mite

This mite has been known as a pest in Australia for a number of years, being first recorded in Western Australia in 1917, whence it has spread to the Eastern States and to King Island. In Western Australia it is regarded as the chief enemy of permanent pastures in the south-west of that State. In addition to causing serious injury to Subterranean Clover in pastures, it is a pest of various vegetable crops. Owing to its association as a pest with light sandy soils, it is probable, should it ever become established in this State, that it will not prove a major pasture pest, but will be responsible in occasional seasons for damage to market crops similar to that now caused to peas by the related mite, *Penthaleus major*.

The Red-Legged Earth Mite is black in colour and has red legs. It may be distinguished from the Pea Mite by the absence of a small red area which, in the latter, occurs on the hind part of the upper surface of the body.

Acknowledgments

I am indebted to the Entomologists of the New South Wales, Queensland and Western Australian Departments of Agriculture for information concerning the distribution of fruit flies in their respective States.

REFERENCES:

Back, E. A., and Pemberton, C.E.: 1916, Jour. Agric. Res., 6, 251; 1918, U.S. Dept. Agric., Bull. 536.

Gjullin, C.M.: 1931, Ecology 12, 245.

Newman, L. J.: Western Australian Dept. Agric., Bull. 122.

BLACK DISEASE IN SHEEP: ITS SYMPTOMS, DIAGNOSIS AND CONTROL

By L. N. THORNTON, Government Veterinary Officer

BLACK DISEASE is a term applied to a specific disease of sheep which is scientifically known as Infectious Necrotic Hepatitis. It has been known to occur in Tasmania for some thirty years. In the year 1928-29, the last year before inoculation was commenced, the financial loss due to this disease was estimated at approximately £80,000.

The disease is caused by a germ, *Clostridium oedematiens*, which is swallowed by the animal while grazing. The germ makes its way to the liver, where it remains dormant until the organ is damaged by young fluke. When the liver in the vicinity of the germ is damaged, the latter commences to grow and multiply in the damaged tissue. During this process a toxin, or poison, is produced which is absorbed by the animal and causes its death.

Black Disease occurs in sheep of all ages and sexes, from weaners onwards. The affected animals are nearly always in good to prime condition, and die rapidly with very little sign of illness beforehand. The presence of the disease is not, as a rule, suspected until sheep which have died as a result of infection are found, the remainder of the flock being apparently healthy.

Animals in the last stages of the disease can often be distinguished if the flock is moved about. The affected animal, which may show no sign while resting quietly, will soon lag behind the rest, not being able to keep up with them. It will then lie down with its head well extended and exhibit symptoms of laboured breathing. The animal will remain in this position and die very shortly (within a few minutes to an hour) without any evidence of struggling.

The differentiation of Black Disease from Acute Fluke infestation is often very difficult, but sheep acutely affected by Fluke are usually seen sick for one or two days before death, and there is a tendency for the abdomen to be swollen owing to the large amount of fluid present in the abdominal cavity.

Anthrax may also be confused with Black Disease, but owing to the almost complete absence of Anthrax in Tasmania it is unlikely that this confusion would occur.

Diagnosis of the Disease in Dead Sheep

Once a sheep has died of Black Disease decomposition of the carcase is most rapid and may become so advanced in a few hours as to mask nearly all of the characteristic signs. It is, therefore, necessary that the carcase be examined as soon after death as possible.

If the animal is found dead within one or two hours of death it appears as though asleep. The skin, however, is quite dark and the wool plucks out very easily. If, on the other hand, death has taken place some time previously, the abdomen may become so distended with gas that the carcase rolls over to one side, and there may be discharges from mouth and nose. Under the skin over the brisket there is generally found some pale or reddish jelly-like fluid. When the skin is removed it has a very dark blue-black discolouration, and it is from this characteristic that the name Black Disease is derived. After opening the abdomen a cupful or two of clear or blood-stained fluid is found in the cavity. The colour of this fluid depends on the length of time the animal has been dead.

The liver, which is the seat of the trouble, is a very dark red and full of blood, and the gall bladder is distended and full of bright green fluid or gall.

If the surface of the liver is examined carefully there will be found on it one or more of the so-called "necrotic areas." These areas, which are a whitish-yellow colour, contrast sharply with the dark colour of the surrounding liver substance. They are roughly circular in outline, clearly marked off from the surrounding tissue, and vary in size from that of a sixpence to a half-crown. If cut into, they are seen to extend some distance into the substance of the liver.

If the chest cavity is now opened, either by cutting through the ribs round the brisket or by cutting the diaphragm, a small amount of fluid similar to that seen in the abdomen will be found.

The contents of the chest are fairly normal, with the exception of the heart. If the heart of a normal sheep is examined during slaughtering, it will be found to be enclosed in a thin, transparent sac which fits it very closely. However, in a sheep which has died from Black Disease this sac will contain a quantity of clear, straw-coloured fluid, or, if the animal has been dead for some hours, it may have clotted to form a jelly.

Thus, it is found that the main signs of Black Disease in a dead animal are—

(1) Bluish discolouration of the skin.

(2) Clear, jelly-like fluid in the abdomen, chest, and round the heart.

(3) Dark liver containing a large quantity of blood and well-marked yellowish areas.

If deaths are suspected to be due to Black Disease, the Animal Health Service should be informed and a veterinary officer will investigate the case.

Control of Black Disease

It has already been stated that Black Disease is caused by the germ *Clostridium oedematiens*, in conjunction with the liver fluke *Fasciola hepatica*. Therefore, the control of the disease involves the control of both these causating influences. Further, it is nec-

essary to make provision for the disposal of carcases of animals that have died from Black Disease.

The first point to be considered is the eradication of the fluke. The organism is found in wet, marshy country and along the river banks and water courses, and it can only complete its life cycle if there is present a certain type of freshwater snail in which it is necessary for the young fluke to spend a part of its life.

Thus there exist two vulnerable points of attack on the fluke—

(1) Destruction of the adult fluke in the sheep.

(2) Destruction of the snail so that the eggs laid by those fluke which reach maturity will not develop to the infective stage for sheep.

It has been found that the most effective drug for the destruction of the fluke in the sheep's liver is carbon tetrachloride. This drug is highly efficient, but only against those fluke which have reached the bile ducts. It has no action on the young immature fluke while they are wandering through the substance of the liver.

The young fluke are liberated from the snail during the summer and autumn months, and it is during these months that the greatest losses occur from Black Disease. However, it takes some six weeks or more before the young fluke reach the bile ducts of the liver, and some ten to twelve weeks before they are mature and commence laying eggs. Therefore, the time of treatment with carbon tetrachloride is during the late summer, autumn and winter months, with a further dose in the spring if necessary, so that the fluke are destroyed as they enter the bile ducts, and before they have time to mature and lay eggs.

The dose of carbon tetrachloride is 1 c.c. for sheep of all ages. This amount is quite effective and may be given with safety; in fact, sheep have been given up to 30 c.c.'s without ill-effect. Owing to the smallness of the dose it is necessary that the full amount be given, and this condition will be observed if the drug is administered by one of the two following methods:—

(1) By means of gelatine capsules.

(2) By means of a syringe.

If the capsule method is employed, the drug is administered without dilution. The capsule is swallowed and the animal receives the whole dose. Soft elastic capsules are put up by various firms, containing the correct amount for each sheep.

If the drug is to be administered in liquid form by means of a syringe, it is found that 1 c.c. is too small a dose to handle without dilution. To overcome this difficulty, four parts of liquid paraffin are added to the drug, thus increasing the dose per sheep to 5 c.c.'s. It is seldom necessary for the stockowner to mix the drench himself, as there are several reliable brands of carbon tetrachloride already mixed with paraffin on the market.

When not being used, the mixture should be kept in a well-corked container as it is very volatile and quickly loses its usefulness when exposed to the air.

For administering the solution, syringes holding the exact dose can be obtained from most chemists.

When administering this drug there are several precautions which should be observed. It has been found that animals which have been fed on concentrates just prior to drenching, or are suffering from a calcium (lime) deficiency, are very prone to suffer ill-effects from carbon tetrachloride. Therefore, it is advisable that all concentrates be withheld for one week prior to drenching, and if calcium deficiency is suspected this should be the subject of veterinary investigation. There is no need to starve the animals either before or after treatment.

The prevention of fluke infestation by the destruction of the snail presents great difficulties in Tasmania. Sheep-raising in this State is carried out chiefly on plains country, cut by numerous rivers and creeks which are subject to frequent flooding. The inundation of the pastures leads to difficulty in drainage, especially in the case of bogs and marshes, and renders the dressing of such areas with copper sulphate (bluestone) almost ineffective. However, on properties located in Black Disease areas, which contain slow-running creeks with boggy banks and waterholes, large numbers of snails can be destroyed by the application of bluestone.

Drainage plays a very important part in the fluke eradication scheme, as moisture is essential for the life of both the snail and the developing fluke. Whenever possible, sheep should be watered from deep holes instead of shallow pools, or—best of all—troughs as the snail is seldom found in water much over two inches deep.

The other method of combating the disease, and the one most effective in Tasmania, is vaccination. This treatment neutralises the toxin, or poison, produced by the germ of Black Disease. Although inoculation is almost 100 per cent. efficient in preventing death from Black Disease (provided it is done soon enough) it has no effect whatsoever on the fluke.

Until recently the vaccine has had to be given in two doses, one of 2 c.c.'s and one of 5 c.c.'s respectively, with one month's interval between them. This gave excellent results, but necessitated a great deal of mustering and handling of the sheep. Owing, however, to recent work done in Melbourne, there has now been produced a vaccine which only requires a single dose—and that a small one, namely, 2 c.c.'s. This new vaccine is a great boon to the stockowner as it eliminates one muster, and it is hoped that its beneficial effects on the sheep will be much more lasting.

Vaccination was first carried out in Tasmania in 1930, when 6,000 sheep were vaccinated on five properties where the disease was known to exist. In these flocks, the average loss prior to vaccination was 5 per cent., a figure which, in every case, was reduced after inoculation to nil.

Although these figures are too small to provide grounds for the claim that the vaccine is 100 per cent. efficient, in later years the mortality has been reduced on certain properties from 20-25 per cent. to 3-5 per cent., which represents a considerable saving.

As the deaths from Black Disease only occur when the young immature fluke are burrowing through the liver, it is necessary

to have the sheep vaccinated before they become infested with the fluke larvæ. Therefore, the most suitable season for inoculation is the summer, and in Tasmania the operation is commenced towards the end of November and is continued during the summer and autumn.

In 1930-31, 50,246 sheep were vaccinated on 59 properties, and this season to date 140,000 on 130 properties.

There is another angle to be considered in the control of Black Disease, i.e., the problem of the carrier. Although vaccination is most effective in preventing the death of infected animals, it apparently has no effect upon any latent germs which may be present in the liver of healthy sheep. Such animals may, if introduced on to an uncontaminated area, infect it following their death from any cause should their carcases be allowed to rot where they lie (a practice far too common in Australia). It has been found that rabbits, too, can pick up the germ and harbour it in the liver and spleen, and the practice of allowing poisoned rabbits which have been running on infected areas to decompose in the pasture has a marked influence on the degree of contamination of the grazing land.

It follows, therefore, that the proper disposal of all carcases on the property is necessary to reduce the degree of infection of the pastures. This is the case whatever the cause of death, since it is not possible to tell whether the animal is harbouring the germ or not. The safest and best method of destroying a carcase is to burn it, but in districts where this is not possible, the carcase and the surrounding soil should be removed to a small area set apart as a burial ground.

If it were possible to carry out to the fullest extent all the foregoing recommendations, Black Disease could be completely eliminated in Tasmania. But conditions in this State are such as to render this practically impossible. Under the circumstances, we have to use those methods which are most suitable for the particular conditions which exist. It has been established that the most satisfactory method of combatting the disease in Tasmania is by inoculation, but this does not mean that the other methods should be neglected.

The regular drenching of sheep and bluestoning of pastures where practicable, not only helps to reduce the incidence of the disease, but also reduces losses from Acute and Chronic Fluke infestation.

Any stock losses should be reported to the Animal Health Service of the Department of Agriculture, so that they can be investigated and the cause determined.

TOBACCO GROWING IN TASMANIA

THE REQUIREMENTS AND POSSIBILITIES OF THE INDUSTRY

By D. H. MALCOLM, Senior Agricultural Officer

TO THE majority of people the idea of growing tobacco on a large scale in Tasmania might seem somewhat fantastic, for, in most of our minds, the cultivation of this crop is associated with a blazing sun and a luxuriant tropical environment. Actually, however, such an impression is erroneous, for Canada produces about 24 million pounds of leaf a year, and tobacco has long been grown commercially in temperate climates such as the British Isles, France and New Zealand. It will be seen, then, that so far as climate is concerned, there is nothing unreasonable in the conception of producing leaf in Tasmania.

It has been ascertained that Chinese gardeners actually grew tobacco here over forty years ago, but the leaf produced was dark and heavy and production eventually ceased. No further attempts were made to develop the industry until some five years ago when hop growers, whose markets had collapsed, began looking for some other crop suitable for irrigation areas and highly capitalised land.

The first plantings on a commercial scale were made in the Derwent Valley in 1931, and highly encouraging results were obtained. To such an extent was this the case that in the following year over 200 acres were planted out. Unfortunately, just as transplanting was commencing a severe outbreak of Downy Mildew ("Blue Mould") wiped out almost the whole of the crop.

This setback had a distinctly sobering influence on intending growers, the result being that in 1933 only 55 acres were grown. Since then strenuous efforts have been made by all concerned to combat the ravages of Blue Mould. There is now reason to believe that success has been attained, and as a result production is again increasing. Last year about 110 acres were planted, an area which it is expected will yield leaf valued at approximately £10,000. In the coming season it is expected that the area planted will reach 150 acres.

Markets and Leaf Type

In connection with most farm crops at the present time the question of limited markets makes any increase in production purely speculative. In the case of tobacco, however, there is an increasing demand for bright flue-cured leaf for light pipe and cigarette tobacco. The total Australian consumption is about 25 million pounds a year, nearly twenty million pounds of which is represented by imported leaf. Thus, it will be seen that we can increase our local production nearly threefold without fear of overloading the Australian market.

The keystone to the position is, however, the question of leaf type.

Thirty years or so ago heavy pipe tobaccos were universally popular and cigarettes almost unknown. To-day conditions have changed, and the heavy, rank tobaccos suitable for making shag and dark plug are almost unsaleable, while what is known as "Virginia" type leaf for cigarette manufacture is at a premium.

Just how the cigarette has grown in popularity is shown by the following figures. In America—i.e., U.S.A.—in 1901, 2,277 million cigaretts were made and consumed. By 1930 the total had reached the staggering figure of 123,810 million. The world war and the almost universal use of tobacco by the feminine element of the community has been largely responsible for this increase.

The same trend has been evidenced in Australia, and to-day medium pipe, fine cut tobacco and Virginia type cigarettes comprise almost the whole of the sales. It is noteworthy that the demand for cigars and Turkish tobaccos is now almost non-existent.

CONSTANT CULTIVATION IS ESSENTIAL FOR RAPID GROWTH

In speaking of leaf of a light type both colour and texture are referred to. These two characteristics are usually associated, however, inasmuch as bright leaf is usually fine textured, while dark leaf is invariably coarse and heavy.

Leaf of a lemon colour, fine and silky in texture, and possessing plenty of elasticity and pleasant aroma, is worth up to 3/9 per pound, and is used for cigarette manufacture. Some of the brighter mahoganies may also be used for this purpose, but the darker mahoganies, which are usually heavier in texture, are more suited to the manufacture of "ready rubbed" and pipe tobaccos.

Soil type is, perhaps, the most important factor in determining the class of leaf which will be grown, and it is recognised that in general the heavier and richer the soil the heavier and darker will be the leaf produced. Soil also influences the aroma, and some soil types produce leaf that is definitely objectionable. Actually, the best leaf is produced on light, sandy soils, which are often so low in fertility as to be almost sterile. In such soils the tobacco is given flavour and aroma by the judicious application of fertilisers.

In Tasmania we appear to have considerable areas of suitable tobacco soils, and experiments are at present being conducted to test the possibilities of commercial growing in these localities (Tas. Jour. Agric., Vol. VIII, No. 1, pp. 17-22).

A FIELD OF YOUNG TOBACCO AT EDITH CREEK

Another peculiarity is that tobacco needs plenty of warm weather to make it grow quickly, but on the other hand too much hot sun during the ripening period results in excessive development of gums and resins so that the leaf becomes harsh and unkind to handle. Nevertheless, tobacco must grow quickly, and as a rule a crop is expected to be ready for curing within sixty to ninety days after it has been transplanted.

A crop that has suffered a setback through drought, for instance, will never make first quality leaf. In much of Southern Australia the rainfall is insufficient for continuous rapid growth and irrigation has to be practised. In Tasmania we are hopeful of development in districts where the summer rainfall is sufficient for the purpose. Speaking broadly, it could be said that a minimum average of two inches per month from October to March is necessary for successful tobacco growing, and, of course, during that period there should be freedom from frosts.

Although there are few other farm crops that will produce such large gross returns per acre as tobacco, there are likewise few other crops that will make such heavy demands both on the land and on the landowner.

The tobacco plant is shallow rooted and rapid in growth, and consequently the crop imposes a heavy drain on the soil. It has already been indicated that a relatively poor soil is necessary to produce good quality leaf, and it follows, naturally, that a continuous cropping programme cannot be followed. Therefore, a sufficient area of land must be available to permit of a regular rotation, and provision must be made for heavy fertilising with superphosphate and potash, and in some cases with nitrogen.

THE FINISHED ARTICLE

Baling Tobacco Leaf for Market

In most countries it is considered that one man can attend to the cultural operations connected with five acres of tobacco; this would include preparation of the soil, raising of seedlings, transplanting, and general cultural operations up to harvest time. Under our conditions it is doubtful whether this would be practicable and extra labour would probably be required for transplanting, and also for certain operations such as topping and suckering. Nevertheless, it is considered that five acres should be considered as a reasonable economic unit.

For the five or six weeks of the harvesting and curing, at least three extra hands would be required, and five or six pickers and stringers would not be any too many.

After harvest there remains a considerable amount of work to be attended to, such as cleaning up the paddocks and destroying

refuse, etc., although this period is actually the slackest part of the year.

In late may or early June grading of the leaf commences, the leaf being sorted into grades depending on colour, texture and size. A good grader would classify about 40 lbs. of Tasmanian leaf per day, and yields are usually round about 1,000 lbs. per acre. Thus, it will be seen that from five acres there would be approximately 5,000 lbs. of leaf to handle, so that extra labour would be necessary for this work, especially in view of the fact that the preparatory work on land and seed-beds is commencing in June and July.

As a rule, grading is completed by about the end of August, by which time seed has been sown in the seed-beds and the new season's plants are being raised. Transplanting of the seedlings commences in late October or early November, and it is only about this time that the previous year's crop is offered for sale.

It will be seen, then, that it takes rather more than a year to grow and market a crop of tobacco, and that the crop absorbs a large amount of labour.

Production Costs

It is difficult to give an accurate statement of production costs as these will vary from district to district according to land values, fertiliser costs, etc. Wages costs also, which represent the largest outlay, will vary considerably, but it can be accepted that costs in Tasmania would be from £40 to £50 per acre. Such figures would, of course, include the value of the farmer's own labour. On the income side one could estimate the yield of marketable leaf at 800 lbs. per acre, valued at 2/- per lb., giving a gross return of £80 per acre, or a nett return of about £30 per acre.

Capital Required

Basing requirements on an area of five acres of tobacco a year, the following buildings would be required:—

Seed-Beds, 3 @ £10	£30
1 Kiln, 16 x 16, @ £120	120
Shed for Storage and Grading	50
	£200

To this must be added the outlay for fertiliser, labour, etc., which would amount to a least another £100, so that an intending grower needs to have a minimum of £300 in sight before embarking on the venture. In this case it is assumed that the usual farming machinery is already on the farm.

In addition to possessing the necessary capital, an intending grower must be prepared to devote the maximum amount of care and thoroughness to every phase of the work and be in a position to meet any of the emergencies that may be depended on to arise. The careless farmer will never make a successful tobacco grower.

In the case of most farm crops work comes to an end with harvesting. Such is not, however, the case with tobacco. Completion of harvesting sees the work barely half done, and it is im-

portant to remember that the crop can be lost within a week or two of its sale just as easily as in the seed-beds, the only difference being that to obtain the finished article a considerable outlay has been made and failures at this time are extremely expensive.

In conclusion, let it be said that as far as Tasmania is concerned we have soils and climate well adapted to tobacco growing, and there is a definite place for this crop in our agriculture.

Tobacco is no more difficult to grow than any other crop, but care and experience are required for successful curing and grading of the leaf.

In other words, any farmer of average intelligence who has the right conditions on his farm can become a successful tobacco grower, and it is hoped that the next year or two will see a marked increase in the area planted out.

BROWNELL POTATO SEED CERTIFICATION

By R. H. BEVIN, Chief Agronomist

THE natural outcome of the Department's work of plant improvement as applied to the Brownell potato crop is the scheme of certification through which it is hoped each year to make available a supply of high yielding virus-disease free seed to all growers of the crop throughout Tasmania.

From a small beginning in 1932 the scheme has taken shape gradually until the present organised system of distribution has evolved.

Three main avenues are concerned in the bulking up and distribution of the seed to the commercial grower on the lower altitudes.

These are as follows:—

1—Tewkesbury Potato Station

At Tewkesbury an area of about 30 acres is planted each year for the production of elite seed stocks. During the growing period the crop is closely watched and heavily rogued to eliminate any weak or "off type" plants and any which may be carrying virus disease. The crop is dug and the seed carefully graded into prime, round seed and "chats." Both prime seed and round seed are sold for the next stage in bulking up.

2—Mother Seed Growers

The seed released from Tewkesbury is sold to experienced potato seed growers whose properties are located at high altitudes. These growers undertake to handle the seed with the greatest care, rogue thoroughly and produce high-grade seed of the requisite standard. Inspections of "mother seed" crops are carried out by an officer of the Department, who must be satisfied that the work of rogueing has been efficiently and thoroughly carried out, and that the sample being bagged at digging time is satisfactory. If the officer is satisfied on these points the bags are sealed and labelled with a tag bearing the description "Mother Seed Brownells." This seed then passes on to the final stage in multiplication.

3—First Harvest Seed Growers

These growers are located on farms above 800 feet in altitude. They purchase seed from Mother Seed growers, and are required to handle the crop with sufficient care as regards rogueing to ensure that the seed, when harvested, will be of a high standard both as regards quality and freedom from virus disease. The crop is inspected during the growing period and, provided it exhibits the required degree of freedom from disease, is again inspected at digging time. At this second inspection the bags are tagged provided the sample being bagged is up to standard. This seed is available for release to commercial growers.

It can be seen that a great deal of close attention is necessary to ensure the maintenance of the seed at a high level of quality, and this standard cannot be reached without the co-operation of the Mother Seed and First Harvest Seed growers concerned. It is essential, therefore, that there should be certain understood conditions governing the growing of seed.

In the first instance the paddocks submitted for registration, and in which the crop is to be grown, must be a reasonable distance—at least 5 chains—from other potatoes, to prevent cross-infection with disease of any kind which might be carried by insects.

The storage of seed prior to planting is likewise important, and the Department urges on Mother Seed growers in particular the necessity of providing a well-ventilated barn and boxes for greening. No other potato seed should be stored in this building. Thus, in many cases a modification of the method of handling potato seed is required of the Mother Seed grower, and provided the crops produced prove satisfactory it is not the Department's policy to change from one grower to another. The Mother Seed grower can thus be regarded as a relatively permanent unit in the scheme. The minimum area for Mother Seed growing is set down as 10 acres unless exceptional circumstances exist. Such an arrangement facilitates inspection of the areas by the officer concerned, and gives a check on the amount of seed required from Tewkesbury each year. The Mother Seed growers selected for the work are so spaced along the North-West Coast as to provide supplies of First Harvest Seed with a minimum of transport expense.

The fact that a Mother Seed grower operates from year to year with a reasonable degree of certainty that he will retain his status in the certification scheme, provided the conditions governing the growing of Mother Seed are observed, makes it worth his while to go to some trouble and expense in handling the seed both before and after planting. Without such continuity of policy the extreme care which is desirable in this phase of the bulking up would be difficult to attain.

In order that as little dissipation as possible may occur in the high quality of the seed, the Department assists wherever it can in the distribution of Mother Seed to registered First Harvest Seed growers. In the same way as the Mother Seed growers are placed geographically at salient points, the First Harvest growers are grouped so as to serve a definite coastal area "on the front" and so eliminate long haulage and expensive transport costs.

The conditions governing the growing of First Harvest Seed are similar to those applied to the production of Mother Seed, though the inspection, while adequate to ensure the necessary standard of quality of the product, is somewhat less exacting than in the case of the latter.

It can be seen that the whole scheme is one of transfer of seed stocks along a regular route—Tewkesbury to Mother Seed grower to First Harvest grower to commercial grower. The maintenance of high quality, and consequently high and profitable yields, depends on the continuous movement of seed, and growers are recom-

mended to renew their stocks each year, passing out their own crops to the grower further along the line. To maintain potato seed crops in a state of good health is a difficult matter, and it does not take long for seed to undergo degeneration, particularly at the lower altitudes. Experiments carried out by the Department have shown that the rate at which the yield falls is extremely rapid, seed which yielded 10 tons in its first year from Tewkesbury falling away to 4 tons at the end of the third season of coastal growing.

Growers at low altitudes particularly should renew their seed stocks each year, and not "hang on," no matter how well the previous crop appeared to be, as there is almost certain to be a loss of 20-25 per cent. in the following crop if coastal-dug seed is replanted. The extra 25/- per ton over market rates is more than repaid by the increase in yield per acre realised by annual seed renewal.

Comments by growers throughout the Coast seem to indicate that the certified potato seed has proved itself to be well worth growing, but a word of warning is needed in regard to the purchase of certified seed lines. The spoken terms "Government seed" and "Grown from Government seed" are often misleading and frequently do not refer to certified seed at all, but in many cases to seed once grown under Departmental supervision but subsequently produced under uncontrolled conditions. Cases of disappointment in the condition of the resulting crop have, almost without exception, been traced to seed having been procured from such indefinite and unreliable sources. No seed is genuine unless it carries the tag of the Department of Agriculture showing that it is officially certified as being grown under supervision and bagged according to standard. *The Department's tag is the only guarantee of quality,* and buyers should see that it is not lacking.

Summary

Elite Seed is grown at Tewkesbury Potato Station.

Mother Seed is grown by high country seed growers (over 1,000 feet) from Tewkesbury stocks.

First Harvest Seed is grown at altitudes over 800 feet from Mother Seed stocks.

Commercial crops are those grown at lower levels from First Harvest Seed. Crop to be shipped.

All certified seed carries the tag of the Department of Agriculture.

So-called "Government" seed is not certified seed unless it bears the official tag.

A list of all Mother and First Harvest Seed growers is published in the Press and in the Journal of Agriculture for guidance of farmers intending to purchase seed.

List of Certified Growers of Mother and First Harvest Brownells, Season 1936-37

MOTHER SEED

A. W. Murfet	Paradise	Mediums and Lates
C. H. Stitz	Hampshire	Mediums
W. E. Rothwell	Henrietta	Mediums and Lates
J. L. Biggins	Yolla	Mediums and Lates
L. J. Clarke	Natone	Mediums
A. L. Cullen	Nietta	Mediums and Lates
F. R. Barker	South Riana	Mediums
A. E. Lillico	Wilmot	Mediums
K. Chilcott	Branxholme	Mediums

FIRST HARVEST SEED

C. Day	Sheffield	Mediums
L. Poulton	Roland	Mediums
Jas. Cox	West Kentish	Mediums
K. Dyer	Sheffield	Mediums
A. W. Murfet	Paradise	Mediums
L. Dyer	Paradise	Mediums
G. Rockliffe	Sheffield	Mediums
F. C. Sharman	Beulah	Mediums
W. J. Richardson	Beulah	Mediums
C. Evans	Barrington	Mediums
A. H. Morey	Barrington	Mediums
J. Lowry	Barrington	Mediums
W. Hill	Barrington	Mediums
F. J. Jacobs	The Needles	Mediums
W. E. Rothwell	Henrietta	Mediums
W. T. Morris	Ridgley	Mediums and Lates
T. Johnston	Yolla	Lates
Bauld Bros.	Oldina	Lates
P. R. Bauld	Oldina	Lates
J. Reilley	Calder	Lates
J. A. Pearson	Upper Castra	Mediums
R. R. Johns	Upper Castra	Lates
R. E. Gardiner	Nietta	Mediums and Lates
J. H. Pearson	Upper Castra	Lates
F. R. Barker	South Riana	Lates
A. E. Lillico	Wilmot	Mediums
J. Ray	Loyetea	Mediums and Lates
R. L. Parsons	Nietta	Mediums
C. E. Williams	South Nietta	Mediums and Lates
R. W. Kirkland	Warringa	Mediums
W. J. Mainwaring	Riana	Mediums
A. Williams	Upper Castra	Mediums
A. Beswick	Branxholme	Mediums
J. H. Bennett	Branxholme	Mediums
N. Campbell	Scottsdale	Mediums

Growers of Mother Seed and First Harvest Seed Up-to-Dates

R. Tole	Myrtle Bank	Mother Seed
N. Wilson	Lilydale	First Harvest Seed
P. W. Edwards	Branxholme	First Harvest Seed

SUBTERRANEAN CLOVER: ITS HISTORY IN SOUTH AUSTRALIA

By ROWLAND HILL, District Agricultural Adviser

THE article printed below appeared in the November, 1936, issue of the Journal of the Department of Agriculture of South Australia, and in view of the fact that such a large proportion of our seed requirements of Subterranean Clover have been derived from that State, and the keen interest which is always manifested in anything which bears upon the history and development of the Subterranean Clover plant, the article is reproduced fully and with due acknowledgments to the South Australian Department of Agriculture. The author writes as follows:—

Having lived my boyhood days, from 1895 to 1912, at Blakiston, and in later years had that district and much of the high rainfall country in the State to attend to as an Agricultural Adviser with the Department of Agriculture, I feel that I should attempt to record some of the history of that wonderful leguminous plant, Subterranean Clover. Subterranean Clover *(Trifolium subterraneum)*, at the present time, is well known throughout the Commonwealth and New Zealand as an outstanding pasture plant and soil builder that has revolutionised the farming practices in the high rainfall country, and has converted large areas of previously despised virgin land into highly productive pastures.

Further than that, land abandoned for cultivation purposes because of its low fertility, has, by the medium of this legume, been rehabilitated to a degree exceeding the expectations of the keenest optimist and, provided it is correctly handled in a course of sound rotation, will allow agriculturists to adopt a system of intensified farming with safety.

South Australian agriculturists have been ever ready to realise quickly the value of sound cultural methods, the use of fertilisers and the necessity to practise rotation of cropping; but, so far as the high rainfall districts are concerned, the acceptance of Subterranean Clover as a soil improver marks the acme of advancement.

Searching inquiries have convinced me that the plant existed on several farms in the Mount Barker and surrounding districts in the very early days of settlement, and, although recognised as a palatable and nutritious food for livestock, its name was not known and its growth was very limited.

The Discovery of the Plant

In 1876, Mr. Amos William Howard, born at Watford, Hertfordshire, England, on 31st May, 1848, arrived in South Australia on the immigrant ship "Lightning," which ran aground on the Troubridge Shoal in the Gulf, and, it is interesting to relate, Mr. T. Bellchambers—afterwards so well known in connection with the Humbug Scrub Sanctuary—was a fellow-passenger.

It was in 1889 that Mr. Howard arrived at Blakiston with his family and, in later years, established himself as a florist and nurseryman on the property known as "Beauvale." The house at "Beauvale" was originally the old Dublin Castle Inn and is now 99 years of age, being still occupied by the Howard family. I had aften discussed the possibilities of Subterranean Clover with Mr. Howard, who informed me that his attention was attracted to the growth of the plant in about the year 1889 on the late Mr. Michael Daley's property adjoining the Mount Barker Springs and Nairne roads and now owned by the Warland family.

He explained that he visited the property with the intention of purchasing a cow from Mr. Daley, who was a livestock dealer, but on finding that gentleman not at home, he strolled along one of the valleys in order to fill in time until the owner returned.

It was during that time that he made acquaintance with the plant and quickly realised its value, although not knowing its name. A short time after this, he found the clover growing on his own property, also on many surrounding farms, and lost no time in expressing his opinion of its worth.

As substantiation of this date, we have record of his letter to the press in January, 1906, when he wrote:—

"In your issue of 17th January appears an article on plants that gather nitrogen by the aid of bacteria on the roots. I do not believe that inoculation of the soil with artificially cultivated bacteria will be successful, except in specially suitable patches of soil. In the Mount Barker district we have a weed which I believe will go far to solve the problem of introducing nitrogen into the soil. This plant is an annual one of the trefoil family. It first made its appearance in a grass paddock at Blakiston some 12 or more years ago, and now it may be seen in most of the grazing paddocks in the district. Although it may be well known to some botanists, the nearest approach to a name for it that I have been able to get is *Trifolium subterraneum*. Whatever its botanical name may be it is here called a clover."

Referring later to this letter, in 1909 Mr. Howard stated:—

"I strongly recommend this clover, and am pretty sure that never before had it been mentioned in connection with agriculture. I took a sample of the plant to Mr. W. Champion Hackett, requesting him to assist in ascertaining its botanical name. This he kindly did, tracing it in Smith's English Botany as a very insignificant weed growing in poor soils. At this time it was unknown to any seedsman in Europe or Australia as a fodder plant; neither had it been catalogued.

"The 'Advertiser' printed the name of *Trifolium subterraneum* for the first time as a fodder plant, and Messrs. E. and W. Hackett, seedsmen, of Adelaide, were the first to catalogue it, and I was the first to bring it to public notice."

As previously mentioned, there is no doubt that the legume had been quite prevalent in that vicinity for many years before Mr. Howard drew attention to its possibilities, but his article just quoted appears to be the earliest recorded data which undoubtedly was the embryo of its popularity.

F

In 1900 Mr. Howard presented a few pounds of seed to my father, who had it sown on portion of the property now owned by Mr. L. T. Cowan, of Blakiston, and it quickly made headway, producing a splendid cut of meadow hay.

Harvesting the Seed

It was in that year that the first serious effort to harvest the seed was made, and I can remember the fruitless attempts of Messrs. Tom O'Donnel and the late Johnny O'Neil, who were employed by Mr. Howard to thresh out the seed with a flail. Various methods of threshing were employed without success, and eventually surface rakings of the plant were put through a hand chaff-cutter and the chaff winnowed to divide the pods from the straw, but freeing the seeds from the pods presented difficulties. However, by hand rubbing and the use of sieves some clean seed was prepared and small quantities sold in 1903 at the price of 2/- per pound.

Two years later, 1905, Mr. Howard approached Mr. F. I. Dutch, of Mount Barker, with the hope of having a machine made to facilitate the cleaning process, and in that year a huller which was worked by two men was built.

Patience and hard work were rewarded when the machine was adjusted to do the work successfully and the use of a horse-works to drive the chaff-cutter and huller made another step of progress.

I am greatly indebted to the Misses Howard, of Blakiston, who allowed me the privilege of perusing portion of their late father's diary in which, amongst other items of interest, was the first recorded sale of clover seed. The item was: "30lbs. of clean clover seed to Messrs. E. and W. Hackett and Company on 18th January, 1906, at 2/6 per pound."

Thus, it seems very evident that this item records the first sale of Subterranean Clover seed commercially, although small quantities had been collected by Mr. Howard and samples for trial distributed to all parts of Australia, New Zealand and South Africa. Most of the seed was collected from the surface growth of plants up to this time, and a sharp shovel was employed to gather the material together, but later the surface soil and buried pods were included.

The pods were separated from the soil with a winnower, and the clean pods treated through the huller before being treated through the winnower to obtain clean seed. As a final process in those days the seed was washed free from dust in order that it might be presented in a brighter condition.

So the work went on at the "Beauvale" farm with the output increasing very slowly, but Mr. Howard, full of enthusiasm and every ready to stress the importance of the legume and its possibilities for the future, did all in his power to give it publicity through the press and other channels he found possible.

Reference to his diary shows that he had realised the value of top-dressing with fertilizers, and in 1908 he had plans showing the portion of his farm treated in that manner.

Attention is also drawn to a paragraph in the "Garden and Field" of June, 1908, which stated that Mr. Hawker was already a great believer in *Trifolium subterraneum* and was planting it on his lower north station.

Figures collected by statisticians show that, in the year 1916-17, 5 cwts. of seed were collected and that the industry came very much into prominence in 1923-24, when 807 cwts. of seed were harvested. From that time onwards large quantities of seed have been collected each season, reaching as high as 5,082 cwts. in 1929-30.

That the industry has become an important one in South Australia will be seen from the following table, which shows the area raked and the total seed collected in each season from 1916-17 to 1934-35.

SUBTERRANEAN CLOVER SEED COLLECTED FROM 1916-17 TO 1934-35, AND AREA HARVESTED

Year	Clover Seed (in cwts.)	Acres
1916-17	5	10
1917-18	24	21
1918-19	—	—
1919-20	73	39
1920-21	30	11
1921-22	104	38
1922-23	23	62
1923-24	807	405
1924-25	1,318	681
1925-26	1,160	473
1926-27	1,533	795
1927-28	1,284	630
1928-29	3,526	1,270
1929-30	5,082	1,736
1930-31	2,320	831
1931-32	921	429
1932-33	2,813	965
1933-34	4,224	1,262
1934-35	4,792	1,768

Mechanical Cleaning

It was in 1920 or 1921 that the Stirling thresher was brought into use, but it was not a great success, although an improvement on previous methods.

The huller which was then being made by Dutch Bros., of Mount Barker, still had to be used to assist in the cleaning process.

Horse rakes were used to collect the top growth, and hand rakes with a duck-bill point to the teeth were employed to collect the buried pods.

This necessitated an enormous amount of hand labour, which proved to be very costly; but the demand for seed caused the price to rise, and in 1923 it reached as high as 6/6 per pound. Suitable fields were rented for the right to collect seed, and as much as £10 per acre were paid—£7 were quite frequently given.

In 1923 a son of Mr. Howard—Mr. Cecil Howard—imported a clover huller from the Birdsell Manufacturing Company of America, which did the complete work of threshing and hulling, successfully assisting in an enormous increase in the output of seed from 23 cwts. in 1922-23 to 807 cwts. in 1923-24.

Messrs. Kaesler Bros., of Hahndorf — keen and progressive engineers—built their first thresher and huller in 1925, and have continued to improve it to the present day, helping the clover seed industry enormously.

Mr. Frank Daniel, of Mount Barker, also built a machine for the same purpose in 1929, and a larger improved pattern in 1931. These machines have a capacity of treating from 25 to 35 cwts. of clean seed per day.

Contracts to thresh and clean seed were undertaken in order to reduce the overhead costs of the smaller growers, thus helping the industry.

Various devices have been made to assist in grading and preparing the seed for market, until at the present time the industry is on a sound footing so long as prices remain in the vicinity of 1/- per lb. for first-grade seed.

In order to keep pace with the improvement in threshing and cleaning methods, attention has been directed to facilitating the collection of pods to supply the thresher. Implements employed have been the Campbell horse rake, road grader, and, later, the revolving road broom drawn by horses.

At the present time the Campbell rake is used to collect the surface growth, and this is followed by sweeping with the revolving broom with considerable pressure applied, sweeping the pods and some surface soil into rows from which it is collected on to trollies and stacked ready for threshing, or carted direct to the thresher.

So the work of the Subterranean Clover industry goes on, with each season finding individuals discovering some improvement in the methods adopted. Clover seed continues to be distributed in large quantities all over Australian and to New Zealand, to take its important part in agriculture, and it will continue to do so for many years to come. Let us hope that the importance of Mr. Howard's foresight will be impressed upon the minds of South Australians more and more, and that Subterranean Clover will be utilised to exploit the undeveloped resources in our high rainfall districts.

To-day, we find scores of farmers from the lower rainfall districts seeking properties in the higer and surer rainfall areas, and the movement is one to be encouraged; but the eagerness of farmers to make the change is definitely a result of Subterranean Clover making economic development of this country possible.

The clover seed industry has become important, but the revenue point of view is only secondary to the importance of Subterranean Clover as a soil improver and a pasture plant capable of converting huge areas of our present scrub country into prosperous rural districts.

The sound advice in Mr. Howard's letters to the press thirty years ago has borne fruit, but the large areas of land with a suitable rainfall still remaining in their virgin state, cannot be considered a fitting memorial to one who so ably blazed the trail in introducing Subterranean Clover.

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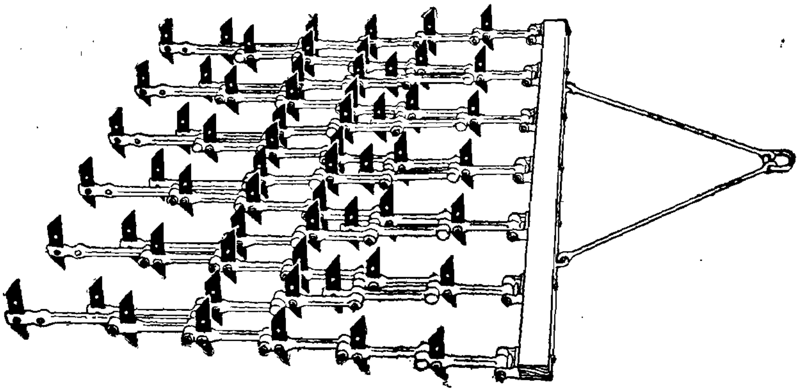

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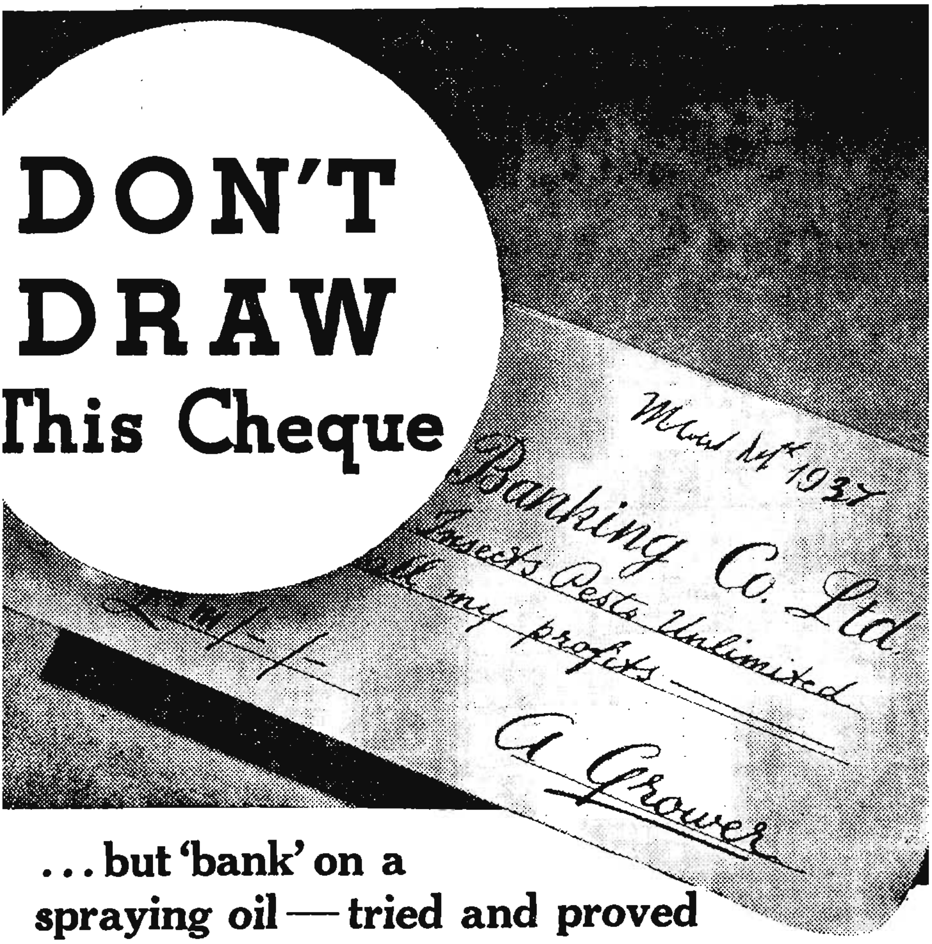

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Fat Lamb Production

The development of the fat lamb industry is receiving special attention. Special arrangements have been made for advances to farmers for the purchase of breeding ewes.

Communicate with the Agricultural Bank or the nearest District Officer of the Agricultural Department for details of scheme.

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Limited funds are available for advances to farmers under "The Unemployed (Assistance to Primary Producers) Relief Act," provided bona fide unemployed persons are engaged in effecting permanent improvements. Loans are free of interest (except where required for building purposes, when 2½ per cent. is charged). Repayment by instalments up to 11½ years, allowing 1½ years before commencement.

Further particulars and application forms obtainable from the Agricultural Bank of Tasmania, Macquarie Street (G P.O. Box 646 C) Hobart; The Agricultural Department, George Street, Launceston, and from District Agricultural Officers stationed at Devonport, Ulverstone, Burnie, Smithton, Scottsdale and Campbell Town.

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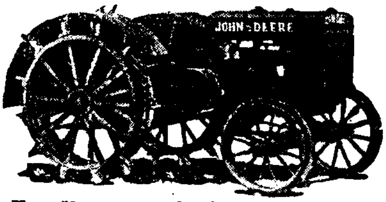

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COMMONWEALTH STOCK AND BONDS BOUGHT AND SOLD

THE APPLE INDUSTRY IN NORTH-WESTERN AMERICA

(Second Part, continued from the February, 1937, Issue)

By P. H. THOMAS, Chief Horticulturist

THE first portion of this report, which appeared in the last issue of the Journal, set out a number of impressions which were gained during a recent visit to America and Canada where various phases of the apple industry were studied. The matters already dealt with concern production, varieties, irrigation, cultivation and manuring, pruning, pest control, grading regulations, picking, grading, sizing and packing. The report is completed in the following pages.

Cases

The standard case measuring 18 by 11½ by 10½ inches (inside dimensions) is employed throughout North-Western America. In California a shallower case known as the "Californian lug" is popular, whilst practically the whole of the Idaho crop is marketed in cheap wooden chip buckets holding one bushel. Four species of timber are utilised in case construction, namely, Spruce, Hemlock, Douglas Fir and Yellow Pine *(Pinus ponderosa)*. The latter is preferred for cold storage purposes.

A large number of cases are still made by hand, but the majority are now constructed by special machinery which is installed in practically all the large packing houses. The majority of the pine cases examined were cut rather differently to those which are familiar here. The end pieces were fully ¾ in. thick and were often bevelled on the edge which comes into contact with the contents. The sides were cut in one piece and averaged ⅜ in. in thickness. Some variation was noticed in the tops and bottoms, but preference appeared to favour a three-piece top and a two-piece bottom, both constructed of material ¼ in. in thickness and wire-laced to the cleats by machinery. In some instances the three pieces which comprise the top are cut out of spruce or hemlock made up in sheets similar to plywood. A lid of this type is well adapted to the "crown pack" system now in general favour owing to the convenience in fixing which it affords. The cleats are sometimes coloured red or blue by immersion in a dye solution, enabling a ready determination of the grade in stacking or sorting.

Coloured labels or impressed designs are used on the ends of the cases, and some arresting designs have been adopted by the large packing houses for use in their selling and advertising propaganda.

Inspection

Although fruit is despatched from the packing house by means of road, rail and water transport, the responsible state, Federal

and Dominion authorities maintain a very efficient system of inspection.

Inspection costs for ordinary consignments, amounting to approximately $5 for a carload of 750 cases, are borne by the producers or packing houses. Platform inspection for cold storage is charged at the rate of 75 cents per hour. Added to these costs are those concerned with analysis and the issue of certificates imposed by the health authorities.

The work of inspection is very thoroughly carried out and an excellent spirit of co-operation exists between growers, packing houses and inspectorial officers. The general procedure is to make a complete examination of a percentage of cases selected at random from the particular lot or carload. Any defective fruits are noted on a sheet provided for the inspection under the following headings: Colour, blemishes, off-shape, worm-stings, scale, decay, rot, maturity and packing. On completion of the inspection the various entries are totalled, and if the aggregate exceeds the tolerance permitted in the particular grade the lot is rejected.

COLD STORES AND PACKING HOUSES, WENATCHEE, WASHINGTON

In the event of the packed lot conforming with the regulations a certificate is issued to this effect together with the details of the examination. Inspection prior to shipment of fruit from the packing houses is carried out on completion of packing, and in no circumstances is a certificate issued on a run of fruit in open boxes or in the packing bins.

Fruit Weights.—A minimum of 42 lbs. of apples per packed case is guaranteed, and in most instances a statement to this effect appears on the case label.

Cold Storage

A careful supervision is maintained over packing; the pack must be tight and not so high as to cause bruising. The Departmental officers do not favour an extreme bulge, but rather a compact pack which gives a crown approximately 2½ in. high. Sizing has already been dealt with under the heading of grading regulations (see previous issue of this Journal, page 9). It was stated that the packer is not bound by regulation to any groups of sizes. In actual practice an even run of fruit is required and the regulations permit up to 10 per cent. of the fruit to be of greater or lesser size than that marked on the case.

The responsibility for ensuring that the pack complies with the grade requirements, and for the repacking of any rejected lots submitted for shipment, rests entirely with the packing house or individual. This principle is adopted throughout all North-Western apple States, and no Department of Agriculture or Federal authority is prepared to shoulder the growers' or packers' responsibility in this respect.

It may be considered that the system of packing and inspection which has been described is rather involved and costly. However, its effectiveness has been proved, and it is entirely on this system that the U.S.A. and Canada have built up their trade to all parts of the world, the bulk of which is conducted on a cash f.o.b. basis.

Without the cold storage facilities which are provided in all the principal districts, marketing on the present system would be extremely difficult, if not impossible. With the approach to maturity and the development of the requisite colour in the different varieties, the crops are picked and forwarded to the packing house. The fruit is then washed, packed, wrapped in oiled papers and placed in cold storage. It is then sold or shipped as required without repacking.

Under the dry conditions existing in the different centres of production fungus disease is rare and very little trouble is experienced from this cause in cool-stored fruit.

The majority of packing house managers and growers regard with disfavour the system of cold storing naked fruit owing to the excessive bruising which results from the subsequent wrapping and packing.

Wenatchee, Washington, possesses what is claimed to be the most modern and up-to-date fruit cold store in the world. It is particularly well equipped for handling fruit, and has a total capacity of 750,000 cases.

Structural systems and methods of refrigeration are very similar to those utilised in Tasmania. A number of cold stores have recently been constructed in which a material named insulite (similar to celotex) is used for insulation purposes directly against the concrete walls of the building. The material is applied in sheets and painted on the outside surfaces. It is claimed that this method gives great efficiency together with a low cost of construction. Cold storage charges range from 11 to 16 cents per case for the season.

Packing and Marketing

At the time of my visit the early Alexander, Gravenstein, Winter Banana, Jonathan, Delicious and Mackintosh varieties were moving on to the market, and opportunity was presented to study the different methods adopted.

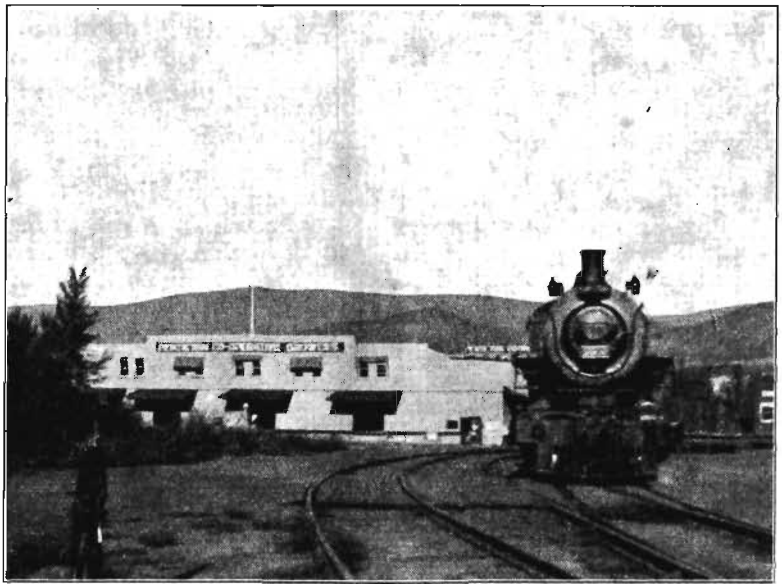
Briefly, growers operate on three main systems—

(a) The handling, packing and selling by co-operative associations of their shareholders' fruit;

(b) The operation of private packing houses;

(c) Packing and marketing by independent growers.

Among the co-operative associations some very strong organisations have been built up which, in some cases, mill their own case timber and own their own cold storage. In addition, the Hood River Association processes its culls into evaporated apples, vinegar and other by-products.



CO-OPERATIVE PACKING HOUSE AND COLD STORE, PENTICTON, B.C.

In comparing costs the co-operatives generally showed a substantial reduction as compared with the private packing houses and independent growers. Especially was this the case in regard to packing and cold storage.

The industry appears to have revised its original ideas of co-operative organisation. Profiting by past experience, the objective to-day is not a one hundred per cent. membership covering all producers, but rather an affiliation of those who are desirable and efficient in their methods.

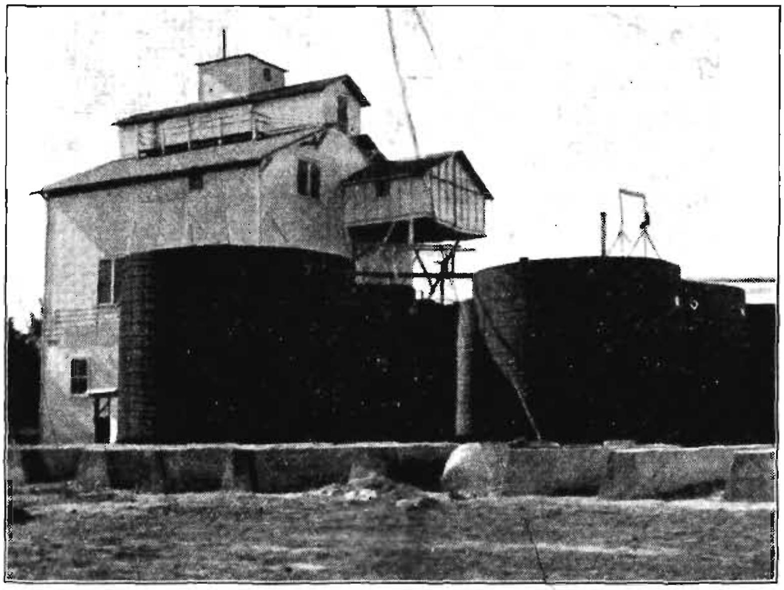
Private Packing Houses.—This type of packing house appears to be firmly established in most districts. Cold storage facilities

are generally available and the proprietors undertake to give a complete service to the grower, which embraces receiving, washing, grading, packing and cold storage.

Fruit is also sold on behalf of the grower, or shipped to market on a commission basis, or, on occasions, bought in by the packing house owner.

Independent growers generally carry out all the essentials detailed above with the exception that they avail themselves of the private cold store and often offer their fruit for sale through the proprietors.

Very little fruit is now forwarded to any market on consignment and the bulk of the overseas and home supplies are bought f.o.b. subject to Government certificate.



VINEGAR FACTORY, WENATCHEE, WASHINGTON

Apple By-Products

Owing to Codlin Moth infestation the percentage of culls in some districts is high. During recent years growers have been much concerned as to the most economic means of disposal of this class of fruit (consisting mostly of apples with a number of healed-over stings). The inauguration of a movement in the principal Washington districts to exclude it from the retail market has rendered it necessary to find other avenues of disposal.

A number of commercial firms have established plants in the various districts for processing apples into various by-products of which the principal are evaporated apples, vinegar and cider.

During recent years prices at the factories for cull apples have been very low; in fact, some of the packing sheds have been satis-

fied to accept nominal price for the fruit in order to dispose of it conveniently and without incurring excessive costs.

Last year, however, a movement was initiated to obtain a minimum price for culls which, coinciding with a short crop, had the effect of increasing prices to $7 and $8 per ton.

Over 80 per cent. of the vinegar used throughout the Western States is manufactured from apples. It is pleasing to taste, and is used for domestic and processing purposes. At some of the vinegar factories the pomace left after juice extraction is dried in a large rotary cylinder and converted into stock food.

Cider and pasteurised apple juice are popular, but the demand is somewhat restricted owing to the competition set up by other fruit juices such as orange, tomato, prune, pineapple and grape fruit.

For 5 cents (2½d.) a glass of freshly expressed apple juice can be obtained at most of the cafeterias or drug stores. Of the other products canned apples, dried apple rings and dried apple chop are commercially produced in large quantities.

Amongst the confections, one known as "Aplets" is being manufactured that is most attractive. This is put up in a large range of sizes and is a valuable advertising medium for the apple industry.

Advertising

Although individual packing associations have carried out a fair amount of advertising, the apple rather lags behind other fruits in this respect, and statistics show a decided decline in the consumption per capita during recent years.

A large number of pamphlets, variety calendars and recipe wrappers are used by the different associations, and although these have served a useful purpose in the past there is a general opinion that the time is opportune for a more organised and sustained effort. With this object in view an agreement has been reached by the principal packing associations, embracing the Hood River, Big Y, Winooka and Skookum organisations, on a joint advertising scheme to operate throughout the U.S.A. The organisation is to operate under the title of "Washington State Apples Incorporated." This scheme will eliminate the present duplication and permit the adoption of a system which will bring the principal varieties prominently before the public in their respective seasons.

A PUBLICATION OF INTEREST TO APPLE GROWERS

Horticultural Aspects of Woolly Aphis Control, Together with a Survey of the Literature. By R. M. Greenslade, in Technical Communication No. 8 of the Imperial Bureau of Fruit Production, East Malling, Kent, England, 1936. 2/6.

THE voluminous literature published during the last hundred years on Wooly Aphis or American Blight, and the divergence of opinion there expressed, have long demanded examination and critical analysis.

In November, 1933, a memorandum and questionnaire on the incidence and control of the pest was circulated by the Imperial Bureau of Fruit Production to all the apple-growing countries of the world and co-operation invited.

The literature and replies to the questionnaire have been thoroughly sifted by the present author, who has now for some years at East Malling been testing new seedlings for immunity, investigating control measures in the orchard and studying the causes of immunity or resistance, and is therefore in an exceptionally good position for examining the situation. This he does most clearly and concisely for practical horticulturists no less than for fellow-investigators, in Technical Communication No. 8.

First the insect and its habits, its spread in the orchard, its methods of feeding, and its possible alternative hosts are dealt with. Next the bearing of climatic factors, temperature, humidity, wind and sunlight in its incidence is considered. In many parts of the Empire the normal combination of these factors is propitious for a heavy attack, whereas in England an increase in temperature and sun, and in Rumania an increased rainfall will induce it. Control measures are considered in detail: (1) Artificial control, including spraying, fumigation, tree injection, cultural practice, etc.; (2) Natural control by *Aphelinus mali* and other parasites; the varying measure of success achieved in different countries is noted; (3) Control by use of resistant stock and varieties. A particularly interesting account is given of existing resistant varieties, of the breeding work in progress in England at Merton and East Malling, and of the few indications afforded as yet of the possible causes of resistance. Lastly, (4) control by legislation, e.g., quarantine measures, etc.

The literature from nearly 300 sources is further dealt with in the two annotated bibliographies which follow. The first, general, contains 555 references; while the second contains 156 references to articles on the biologic control of the pest.

Finally, the memorandum and questionnaire noted previously are reproduced in full, together with a list of persons who replied. This list forms, incidentally, a useful index of workers interested in the subject.

Both to investigators and growers this publication should prove of great reference value.

LITTER TESTING

A SYSTEM OF PRODUCTION-RECORDING AS APPLIED TO THE BROOD SOW

By J. T. ARMSTRONG, Chief Dairy Officer

FOR many years production recording has been the accepted practice with a large number of dairymen, the object being to determine the actual amount of milk and butterfat produced by each individual member of the herd for a complete lactation period; but although the same principle is applicable to the pig industry, the practice is seldom, if ever, adopted in this State.

Litter testing or pig recording has been practised for many years in Denmark and Sweden, is becoming very general in England and America, but is the exception rather than the rule in Australia. Very few pig producers, even stud breeders, keep any records of litter size or rate of growth of the young pigs, both factors which have a very great bearing on the economics of pig raising.

Not only does litter testing give a reliable indication of fecundity of the breeding stock and rate of growth of the young pigs, but it provides a reliable check on the sufficiency and suitability of the ration fed.

The object of litter testing—unlike herd recording—is not to obtain a definite measure of the milk and fat yields, but to obtain reliable data on the following points:—

(1) The fecundity of the sow; that is, her ability to produce consistently large litters.

(2) The capacity of the sow to produce sufficient milk to enable her to rear a large litter.

(3) The ability of the litter to put on flesh rapidly.

(4) The suitability of the ration provided.

The first three factors — namely, litter size, the capacity for milk production, and the ability of the litter to put on flesh rapidly —are hereditary ones; that is, they are factors which are inherited from the parents and are passed on to the offspring. The three are, however, more or less independent of each other, and the object of recording is to enable the pig producer to select or evolve a strain of pigs which combines these three factors.

Sows can be selected which produce large litters but whose milk-yield is so low that the young pigs do not obtain sufficient food to enable them to develop at a satisfactory rate. Similarly, sows can be found which regularly give small litters; such sows may have a limited milk yield or may give more milk than the small litter requires.

It is possible to select sows which give big litters which do not, however, develop rapidly even with the best of feeding, and may

take $4\frac{1}{2}$ to 5 months to make porker weights, whereas the progeny of another sow, similarly fed, may reach the required weight at 14 or 15 weeks.

To be successful, the producer must obtain breeding stock which will give large litters of quick-growing pigs, and to do this some system of record keeping is essential.

As mentioned earlier, the three factors sought are hereditary factors and are more or less independent; that is to say, that because a sow gives a large litter it does not necessarily follow that she will be a heavy milker, or that the pigs will mature early even if they do make rapid gains prior to weaning.

Each factor should be separately recorded, and by combining the results obtained a useful knowledge of the breeding stock will be acquired.

Litter Size

The number of pigs produced in each litter is controlled by the inherited capacity of the sow to produce big or small litters. It is practically independent of the breeding of the boar, provided that he is not very closely related to the sow, and even then his influence is not very great except in certain cases.

The number in the litter depends almost solely on the number of ova which are expressed by the sow and which, after fertilisation, develop normally.

In some sows it has been found that, even though a large number of ova are fertilised, they do not all develop to maturity; some embryos die and are absorbed, and their failure to develop to their full term appears in most cases to be an inherent fault in the sow.

There is, however, a considerable amount of evidence to show that a diet lacking in protein may be a contributing or even decisive factor.

In assessing, therefore, the sow's capacity to produce large litters from a recorded number of births, a knowledge of the ration the sow was receiving is necessary, and if she had received a limited ration, or a ration low in protein, she should not be condemned as a brood sow even if the size of the litter was small.

As litter size is an hereditary factor, when selecting a gilt which it is intended to keep as a brood sow, one from a large litter should be selected, and it is advisable to consider not only the size of the litter from which she had been selected, but to have some knowledge of the productive ability of her dam's dam and her sire's dam.

It is possible to find strains which always produce big litters—that is, strains which are more or less pure-bred for large litters. Similarly, it is equally possible to locate strains which always give small litters—that is, strains which are more or less pure-bred for small litters. In addition, crosses between these two strains are liable to occur, in which case one sow may give consistently large litters, whilst a sister sow may produce only small litters.

This intermediate strain is most frequently met with, owing to the more or less indiscriminate breeding which has been the practice, but if a gilt is selected from stock which are known to give

consistently large litters there is a very big possibility that she herself will have large litters. If, on the other hand, any of her immediate ancestors are noted for small litters there is always a possibility that she may have inherited that fault.

As the factor for litter size is inherited from both the sire and the dam, both sides of the gilt's pedigree should receive attention. How she has been influenced by heredity can only be determined by keeping a record of the number of pigs she herself produces in each litter, since the size of her litter is practically independent of the boar to which she is mated and depends on the number of ova which have developed to maturity after fertilisation.

To determine whether or not a sow is satisfactory so far as litter size is concerned, the simplest form of recording is sufficient. This method will consist merely of keeping a record of the number of pigs born in each litter and the number of litters obtained each year.

A sow should be capable of rearing an average of from eight to ten pigs per litter, and two litters per year. Sows which average less than this number should be discarded, provided that, as mentioned earlier, the size of the litter has not been limited by improper feeding.

Milk Yield

The second factor to receive attention is the sow's capacity to produce sufficient milk to enable her to rear a large litter.

It is common knowledge that heavy milking strains of dairy cattle exist and that other strains are noted for small yields, whilst the majority are intermediate between the two, some cows being heavy producers whilst close relatives are hopeless failures.

The same principle applies to pigs. A proportionately heavy milk yield is as important with the sow as with the cow, since a sow that it not capable of an adequate milk flow cannot successfully rear a large litter, and in consequence either the weaker pigs will starve or the whole litter will be under-nourished and will not make the growth between birth and weaning which is expected.

Owing to the fact that the young pigs are completely dependent, for the first few weeks, on the sow for their nourishment, her capacity for milk production may be measured by the growth of the litter, and this can be determined by weighing each of the young pigs at birth and again at weaning. Fuller information will, however, be obtained if an intermediate weighing can be made. This should be done when the pigs are about 4 to 5 weeks old, since after that time they are generally given some supplementary fodder.

Sows whose litters do not make the gain expected should not be used for breeding, but here again the question of the ration the sow has been receiving must be taken into consideration, since if she herself is not properly fed she cannot be expected to give her maximum milk yield.

The second principle of recording, therefore, is to weigh the members of the litter at birth, again at from 4 to 5 weeks of age,

and finally at weaning. All weights to be recorded and not m memorised.

Earliness or Lateness of Maturity

The third factor to be considered is the age at which th reaches porker or baconer weight, since it is obviously much profitable to have a pig ready for the porker market at 14 1 weeks than at 17 to 18 weeks.

The factor for earliness or lateness of maturity is an hered one, and is transmitted through both sire and dam. That is, not a factor for which the sow is wholly responsible.

As in the case of milk production, the capacity for quick or growth cannot be determined merely by an inspection of the but it can be ascertained by keeping a weight-for-age record o litter.

In purchasing either a sow or boar for use in the stud, from quick-growing litters only should be considered; but, u definite figures are available as to their early rate of growth o rate of growth of their near relatives or progeny, the purchase be more or less a blind one. If, however, the purchaser kee weight-for-age record of the progeny he will be able to deter whether his selection has been a wise one or whether the so boar should be discarded.

A weight-for-age record is kept by weighing the pigs jus fore they are forwarded for sale and noting against the weigh age of the pig.

Here again records can only be interpreted in the light o ration which has been provided, since a limited or unsui ration will definitely affect the rate of growth.

A complete record of litter performance must therefore be and should include—

(1) The number of pigs in each litter born and reared.

(2) The weight of each pig at birth, at 4 to 5 weeks, ar weaning.

(3) The age of each pig at weaning, and again when mark

(4) The weight of each pig when marketed.

(5) Notes on the feeding of the sow before the litter is and when rearing the litter.

(6) Notes on the feeding of the litter before and after wea

The type of the pig is a matter of considerable importance involves such considerations as length of carcase, the admi of fat and lean, thickness of the back fat, thickness of the meat, and the relative weights of shoulders and hams, etc.. very useful if a record can be obtained from the factory as to general type of the carcases forwarded and this report appe to the previous records. These particulars are not, of course, a able in every case, but where they can be obtained they gi completeness to the litter record which is not possible wit them.

The following weight-for-age figures, abstracted from a report of the Harper Adams College Pig Feeding Experimental Station in England, and published in Vol. 16 of the Pig Breeders' Annual, may prove of interest to producers as a basis for comparison with their own records.

Age	Live Weight (lbs.)	Age	Live Weight (lbs.)
1 day	2.9	17 weeks	73.3
1 week	5.4	18 ,,	79.2
2 weeks	8.3	19 ,,	86.8
3 ,,	10.8	20 ,,	92.7
4 ,,	13.2	21 ,,	101.6
5 ,,	16.0	22 ,,	109.1
6 ,,	19.3	23 ,,	117.3
7 ,,	22.7	24 ,,	126.2
8 ,,	26.7	25 ,,	134.7
9 ,,	30.1	26 ,,	143.6
10 ,,	34.6	27 ,,	153.2
11 ,,	38.0	28 ,,	162.7
12 ,,	43.3	29 ,,	173.9
13 ,,	49.4	30 ,,	180.8
14 ,,	54.0	31 ,,	189.5
15 ,,	60.0	32 ,,	197.1
16 ,,	66.9		

THE LUCERNE FLEA

By J. W. EVANS, Entomologist

Introduction

IT IS probable that the Lucerne Flea *(Smynthurus viridis L.)* is one of the most widely known insect pests in Tasmania, yet few people are actually familiar with the insect itself, its life history, and the incidence of its occurrence in the State. This insect, which is a native of Europe, was introduced into South Australia about 50 years ago and into Tasmania about 14 years ago, and is now established in a number of localities within the State where it is responsible for extensive damage to pastures, especially those sown with Subterranean Clover *(Trifolium subterraneum).*

The injury caused by its feeding activities consists of holes eaten in the surface of the leaves; severely damaged plants bear skeleton leaves only, all the green tissue having been removed and only the veins remaining intact.

Successful control may be obtained by spraying an infested area with lime sulphur at a strength of one gallon of lime sulphur in forty gallons of water.

The principal purpose of this paper is to record the result of an investigation made to determine the number and extent of the generations of the Lucerne Flea in the northern coastal districts of Tasmania, such investigation having been undertaken with a view to collecting data to serve as a guide to the application of control measures.

Life History

The Lucerne Flea, which is a small yellowish-green wingless insect, derives its name from its ability to leap into the air if disturbed, and not from any relationship with true fleas. When not engaged in feeding, it rests on the soil surface, upon which it lays its eggs. These are seldom seen, since they are covered with a brownish deposit consisting principally of ingested soil particles. Hatching of the eggs take place when moisture conditions are favourable, and when the soil surface is dry hatching is retarded until the onset of wet weather. Young insects, which on leaving their eggs differ from the adults only in point of size and in sexual immaturity, are susceptible to high temperatures, and daily mean temperatures above 60° Fahr. are unfavourable for their development and survival. Hence it is only during the autumn, winter and early summer months that climatic conditions are favourable both for the hatching of the eggs and the development of the insects.

Limits of Possible Distribution

In recent years a considerable amount of research, concerned with the Lucerne Flea in relation to its environment, has been carried out both in England and Australia, and in a Bulletin published by the Council for Scientific and Industrial Research (David-

son, 1934), a series of maps was given in which were shown the limits of the possible distribution of this pest within Australia. These maps were divided into zones, differing from each other in degrees of favourableness, and based on climatic data. The zone type in which conditions were found to be most favourable for the insects' activities does not occur in this State; the limits of the remaining zones are shown in the accompanying map (Fig. I). Records of the distribution and relative intensity of the pest within the State testify to the value of this map.

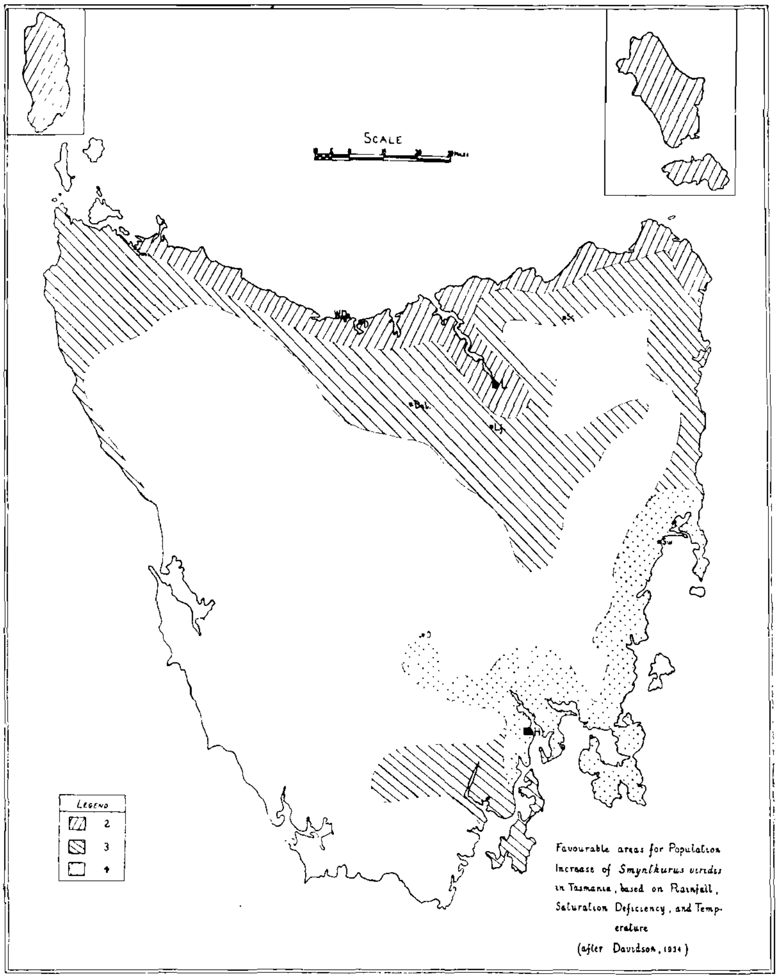


FIG. I

Sm., Smithton; W.D., West Devonport; D., Devonport; Del., Deloraine; L., Launceston; Lf., Longford; Sc., Scottsdale; Sw., Swansea; O., Ouse; H., Hobart.

Seasonal Abundance

In England, as recorded by MacLagan (1932), the Lucerne Flea may be found in pastures during nine months of the year,

from the middle of April (early spring) until December (mid-winter); during this period there are six generations. The three months when it is absent are passed in the egg stage, low temperatures and not lack of moisture here being the limiting factor. In South Australia in the most favourable zone, the flea occurs from early April (autumn) until the end of October (spring). Davidson suggested that in Tasmania, "owing to the extended winter period, population increase will be severely restricted, and the insect will be scarce to absent in mid-winter." Population samples taken at West Devonport, on the North-West Coast, during the past two seasons have not borne out this surmise, and although adult insects have been scarce during the winter months, both young and older nymphs have been abundant. The samples were taken at weekly intervals by means of metal cylinders four inches in diameter, similar to those described by Davidson and Swan (1933). Six cylinders were used for each count.

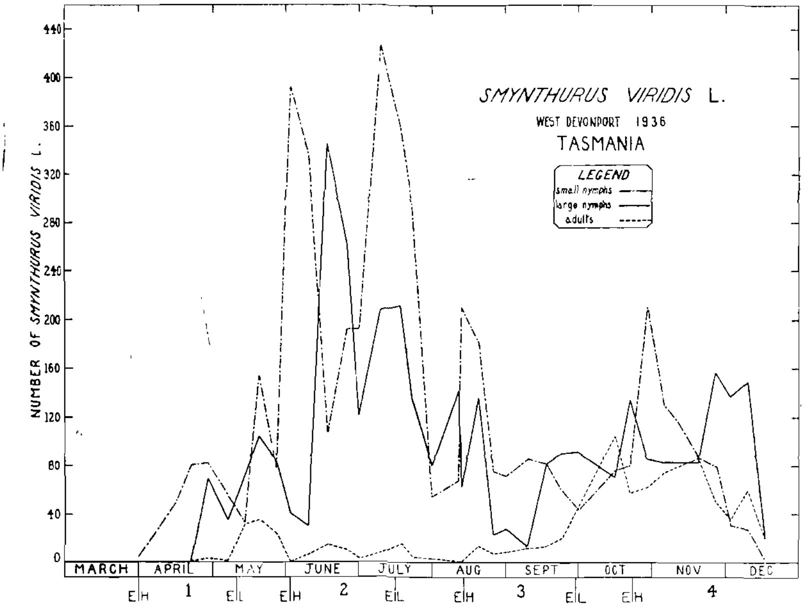


FIG. II

Fig. II indicates the progress of the population during 1936, and although such sampling methods as were used can only give a rough approximation of the changes in population abundance they do give a sufficiently reliable indication of the relative proportion of the nymphs and adults during the different months.

The letters at the bottom of the diagram indicate the limits of the periods of generations, E.H. representing "Eggs Hatching" and E.L. "Egg-Laying." The figures represent the number of generations. It must be understood that the periods shown are approximate, since they are based on screen temperature-readings used in conjunction with the temperature-development curves given by Davidson. At the beginning of April only newly-hatched nymphs were present in the samples; towards the end of the same month

some of these had increased in size, and during May adult insects were in evidence. The big increase in nymphs towards the end of May resulted from the hatching of the eggs laid by the first brood of adult insects.

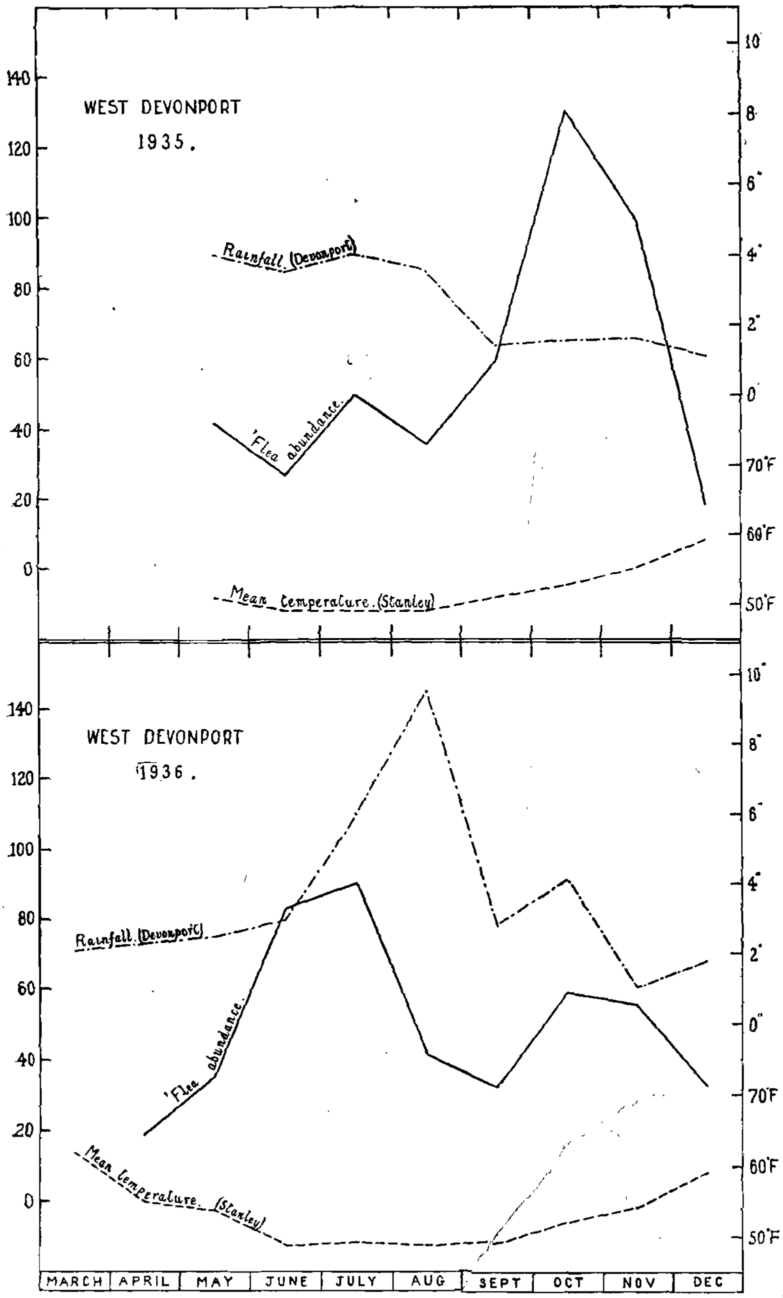


FIG. III

Attention is directed to four points in the chart; the sudden increase in numbers following the hatching of the eggs laid by the first generation; the scarcity of adult insects during the winter months; the increase in the total population during the spring, and the sudden drop in numbers during mid-December.

In Fig. III the total number of insects taken in the samples during each month is shown for both 1935 and 1936. As previously stated, the sampling methods employed cannot be depended upon to give more than an approximate indication of the intensity of the population, but merely serve to show that there are two periods of population increase, one during mid-winter, the other during the spring. No meteorological readings are available for West Devonport, hence those of the nearest stations have been used.

It is possible that the apparently greater winter population of 1936 as compared with that of 1935 may have been due to the higher temperatures recorded for May causing accelerated development. The lower spring numbers in 1936 as compared with 1935 may be explained by the abnormally high rainfall of 1936, which may well have caused the destruction of large numbers of the third generation.

Control Measures

Until the past season it had been the custom to give numerous applications of lime sulphur to infested pastures. It has now been shown by both experimental and large scale spraying operations that adequate control can be secured with only two applications. This applies to infestations in Zone 2 (Fig. I). It is probable that in Zones 2 and 4 one application would prove sufficient in most seasons. The ideal time for the first spray application is during the autumn, after all the over-summering eggs have hatched, but before any insects have reached the adult stage and themselves laid eggs. This is because, whilst lime sulphur is toxic to the insects it does not affect their eggs. In practice this is seldom possible because of the difficulty of determining the exact period and also on account of its short duration. Hence it is recommended that the first application be made either during May or the first half of June, the pasture being closely grazed before treatment, and a second application in early spring from August until the middle of October, but not later than the end of the month. The purpose of these sprays is to destroy large numbers of the insects prior to the two periods of population increase.

Dusting experiments with sulphur and a mixture of sulphur and pyrethrum (1-5), which gave promising results under laboratory conditions were not satisfactory when repeated in the field.

Biological Control

In 1934 the Division of Entomology of the Council for Scientific and Industrial Research was instrumental in introducing the predatory mite *Biscirus lapidarius* Kramer (an insect which preys on the flea) from Western Australia into various localities within the State. The mite, which was first noticed in Western Australia, has not since been discovered in, or close to, any areas where it was

liberated in Tasmania. However, it has been found in several other districts, and there is good evidence to suppose that it is an important factor in reducing the intensity of infestations.

A preliminary distribution of mites was made to a number of flea areas during the winter of 1936, and further work along these lines will be carried out during the present season.

REFERENCES:

Davidson, J., and Swan, D.C.: 1933—Bull. Ent. Res. 24 (3), 351.
1934—C.S.I.R. Bull. 79.
McLagan, D.S.: 1932—Bull. Ent. Res. 23 (1, 2).

ACCREDITATION SCHEME FOR ABORTION-FREE DAIRY HERDS

THE following are the conditions under which the Department of Agriculture, through the Animal Health Service, will certify pure-bred or grade herds free of Contagious Abortion:—

1. A herd may be designated as an Accredited Contagious Abortion-free Herd when it has passed two consecutive agglutination blood tests at intervals of at least 90 days, without evidence of infection, and the other necessary requirements have been carried out.
2. Before any herd is accepted for accreditation the conditions existing must be investigated and approved by a veterinary officer.
3. Each herd coming under this scheme shall be placed under the control of a veterinary officer to whom the contracting party (hereafter termed the owner) shall be responsible for carrying out the terms of this agreement.
4. The owner shall properly identify every animal and supply to the veterinary officer in charge a full list of animals in the herd, or shall bear the expense of eartagging or otherwise marking each animal in a manner deemed satisfactory by the Chief Veterinary Officer.
5. The owner shall maintain the premises in a proper sanitary condition.
6. The owner shall permit blood samples to be taken from all cattle from time to time as required.
7. If, at any agglutination blood test, reactors are found the herd will be subjected to further tests at frequent intervals until it has passed one blood test and then has passed a subsequent blood test after an interval of at least 90 days without evidence of infection and the other necessary requirements have been carried out.
8. The owner shall immediately remove from the herd, and effectively isolate, reacting animals, which shall be branded and sold for slaughter only, unless, in the opinion of the veterinary officer in charge, facilities are present for fattening or for maintaining two herds without risk to the herd undergoing accreditation.
9. If an abortion occurs the fœtus and after-birth must be burnt immediately and the contaminated ground or shed thoroughly disinfected. The veterinary officer in charge must be notified immediately and the aborting animal isolated. Should the animal react to a blood test the whole herd will be re-tested in accordance with the requirements of Condition No. 7.
10. Cattle belonging to the herds entered under this scheme must not be brought in contact with any other cattle, except as provided for in Conditions Nos. 11 and 12, or at a Show approved by the Chief Veterinary Officer. Special permission for Shows other than those approved shall only be given subject to the completion of further subsequent blood tests.
11. Cattle from an accredited herd may be removed to another accredited herd provided that the veterinary officer in charge has been previously notified and has agreed that all reasonable precautions have been taken to minimise the risk of infection during transit.
12. Bulls from an accredited herd may be used for cows of another accredited herd under such conditions as are approved by the veterinary officer in charge.
13. Calves after being weaned from mothers must be fed on milk from non-reacting cows only, and may be added to the clean herd at the discretion of the veterinary officer in charge.

14. No animal shall be added to a herd entered under the scheme, unless from (a) an accredited herd, or (b) a herd declared free of Contagious Abortion by the Chief Veterinary Officer, or (c) if from herds not included under (a) or (b), it is non-pregnant and has passed two blood tests at intervals of not less than 30 days, and has not, in the opinion of the veterinary officer in charge, been subject to the risk of infection during the period between the tests.
15. Once a clean herd is established it shall be tested as required by the Chief Veterinary Officer, but not less than once during each year for the first three years, and then subsequently as the Chief Veterinary Officer may determine.
16. Notwithstanding anything in the abovementioned conditions the veterinary officer in charge shall have the power to take any such steps as may be necessary to safeguard from infection a herd brought under this scheme.
17. The owner shall agree to abide by all the aforementioned conditions, failure to observe any of which shall constitute sufficient reason for the cancellation of the certificate.

In pursuance of the carrying out of these conditions, the Department of Agriculture will issue a certificate valid for one year, signed by the Chief Veterinary Officer, and will publish in the "Journal of Agriculture" a list of Contagious Abortion-free herds and will maintain such lists in order that owners who have gone to the trouble and expense of obtaining such a Contagious Abortion-free herd may benefit by the agreement.

Chief Veterinary Officer

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THE GARDEN

By H. A. TURNER, Horticulturist

BEDS where autumn crops were grown will in most cases be overrun with weeds, and if allowed to remain without attention will be difficult to prepare for seed sowing in the spring. Land that is in this condition at the present time should be dug over and left in a rough state throughout the winter. This allows weathering agencies such as frost and rain to play their part in bringing about conditions which will make for a good tilth when the season for sowing or planting comes round. This is particularly important in respect to heavy loam or clay soils, which on no account should be cultivated when wet or sticky. If dug over when comparatively dry in the autumn and left till the spring their preparation for seed sowing will not usually present any great difficulty.

In a general way it is not a good policy to apply fertilisers to light soils until the spring, but with the heavy types a dressing of stable manure spread over the surface before digging begins in the autumn may be profitably applied. When applied in the autumn stable manure should preferably be in a "green" state—that is, not rotted down. If in this condition it is very helpful in bringing heavy soils into good tilth, but for spring use it should be thoroughly decayed.

In many places it is practically impossible to procure farmyard manure in quantities sufficient even for a small garden. Under these circumstances it is necessary for the gardener to make other arrangements for supplying organic matter to the soil, and the most practical alternative is that of growing green crops to be dug in. The digging-in of a growing crop not only helps to keep up the supply of humus and nitrogen, but it also assists materially in conserving moisture and mineral matter.

In light sandy soils or well ærated soils, green manure decomposes more rapidly than in heavier soils, and the period that elapses between turning under the green material and planting the new crop need not be so great as in the case of dense or heavy soils.

Horse beans are a hardy and useful green crop for the garden, but if the seed is not available field peas, either alone or mixed with oats, are excellent.

Under Tasmanian conditions it is best to sow for green manure in the late summer so that the crop will be ready for turning under in the early spring months. A dressing of superphosphate at the time of sowing is usually necessary.

The garden compost heap is a good method of converting garden refuse into first-class fertilising material, particularly where there are quantities of lawn clippings to be disposed of. The method commonly adopted of allowing grass clippings, straw, and other refuse to decay without chemical treatment of any sort will produce only a second-class material. If, however, the gardener will go to some little trouble in preparing and treating a compost heap the resulting material will be equally as good as decomposed

stable manure. The following is a good method: A heap should be started in which grass clippings, vegetable waste from the garden, and even straw, is collected into a layer of some few inches deep. The surface is then sprinkled over with ground limestone. Approximately six pounds of lime to every hundredweight of refuse will be about right. Sprinkle also with a few handfuls of superphosphate and about a couple of pounds of sulphate of ammonia, and fork in. Successive layers may be added and treated from time to time, and when the heap is completed it should be covered with an inch or so of fine soil.

If the heap is kept damp but not saturated, the material will ferment and decompose so quickly that it will be ready for use in about ten weeks provided the weather is warm. In the winter months the process will be considerably delayed.

The value of occasionally liming the soil in the average vegetable garden should not be overlooked. It is often said that the exposure, by cultivation, of sour or acid soils to the action of frost and sun has a "sweetening" effect, but that is not so. Acidity is due to a lack of lime often brought about through leaching, or in some cases through a shortage of lime in the original soil-forming material, and the condition can only be rectified by the use of lime.

Some crops—potatoes and strawberries, for instance—do quite well in acid soils, but many of the best vegetables, such as asparagus, spinach, beet, lettuce and celery, are very sensitive to and will not thrive in acid soils, and it is safe to say that most of our vegetable crops are at their best in soils where there is no shortage of lime.

Over-liming is possible, and in some cases has a depressing effect on plant growth. The injury to the soil, however, does not persist and will usually wear off in a few months.

The amount of lime that should be applied as a dressing depends on the degree of soil acidity, and this can only be accurately decided by a chemical examination, but under average Tasmanian conditions an approximate lime dressing can be applied with confidence.

Lime is generally used either in the form of slaked lime or ground limestone, but sometimes quick-lime is the only form available. It is perhaps of little importance which form is used, provided the gardener remembers that 100 pounds of pure ground limestone, 74 pounds of slaked lime, and 56 pounds of quick-lime all contain the same amount of lime, and are therefore of equal value in the garden. The above applies to pure substances, but most limes contain impurities and allowances must be made accordingly. Lime should always be bought on its analysis in which the percentage of purity is stated.

On heavy soils one pound of slaked lime, or its equivalent in either of the other forms, would be a good dressing; but on light soils half that amount would probably be enough.

On account of their properties, both quick-lime and slaked lime should be applied in the autumn or winter when the land is not occupied by vegetables, but ground limestone can be applied at any time and on any soil.

ABORTION-FREE HERDS

THE following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Owner	Address	No. of Cows
Reynolds, H. B.	Relbia	19
Archer, C. A.	Calder	8
Foster, R. J. L.	Evandale	76
Jessup, H. J.	Scottsdale	48
Coombe, B. R., and Bedlington, W. C.	Forth	56
Mervyn Bræ Stud	Scottsdale	35
Ashley Home for Boys	Deloraine	31
Steel, L. J.	Falmouth	176
Lansdell, Mrs. E.	Bracknell	24
Heazlewood, H. R.	Whitemore	11
Hiscutt, J.	Howth	62
Gladman Bros.	Carrick	26
Fisher, J. E.	Oatlands	19
Barnett, D. G.	Edith Creek	19
Beveridge, H. C., and Sons	Latrobe	39
Ollington, W. L.	Forest	23
Midgley, A.	Penguin	27
Fahey, Mrs. J.	Lileah	6
Spinks, K.	Lileah	5
Griffin, J. R.	Gunn's Plains	28
Relbia Farm and Dairy Co.	Relbia	84
Fergusson, F. C.	Penna	50
Lambert, J. D.	Latrobe	28
Edwards, J. C.	Derby	34
Richardson, A. J., and Sons	Chudleigh	28
Heazlewood, T. A.	Hagley	15
Bovill, H. Y.	Devonport	48
Green, S. G.	Penquite	45
Geale, G.	Jetsonville	31
Reed, G. E.	Berriedale	33
Scott, H. Barclay	Whitemore	55
Roebuck, N.	Native Plains	60
Johnson, J. F. and G. M. L	St. Helens	10
Briggs, A. H.	Scottsdale	32
Briggs, C. H.	Scottsdale	38
Stancombe, A. J.	Western Jnc.	40
Perkins, V.	Latrobe	72
Wells, H. Lucadou	Carrick	53
Thompson, J. H. (Estate)	Flinders Island	116
Hall, E. G.	Alanvale	97
Stuart, L. A.	Whitemore	57
Heazlewood, R. K.	Whitemore	34
Sadler, B. T.	East Devonport	140
Ranson, F. W.	Derby	51
Priestley, T. R.	North Scottsdale	53
Robotham, H. V.	Ridgley	27
Badcock, Mrs. F. R., and Sons	Whitemore	19
Badcock, B. M.	Whitemore	23
Hingston, S. J.	Whitemore	18
Cowie, A. E.	Flowery Gully	76
Beardwood, T. J.	Prospect	3
Gardner, H. R., and Sons	Relbia	189
Loosmore, T. C.	Scottsdale	25
Salier, H. G.	Scottsdale	14
Taylor, M. K.	Brighton	37
Jessup, A. V.	Springfield	22
Smith, E. J.	Springfield	35
Badcock, L. A.	Whitemore	18

Owner	Address	No. of Cows
Haines, H. C.	Ringarooma	39
Williams, J. H.	Springfield	18
Hookway, H. H.	Scottsdale	43
Wells, J. L.	Mt. Hicks	17
Treloggen, J. W., and Sons	St. Helens	137
Treloggen, D.	St. Helens	52
Gowans, W. C.	Glengarry	13
Clifford, F. G.	Kellevie	28
Meredith, D. O.	Plenty	39
Watchorn, J. B.	Kingston	18
Dransfield, W.	Copping	12
Bryan, J. R.	Copping	23
Smith, W. J.	Copping	20
Morse, R. V.	Yolla	32
Tatnell, T.	Bream Creek	19
Cooley, H. S.	Bream Creek	15
Hanslow, G. T.	Cambridge	33
Mental Diseases Hospital	New Norfolk	62

CHILD WELFARE

THE CHILD WITH THE "FINICKY" APPETITE

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

GENERALLY speaking, the normal child, existing in a natural, healthy environment, is a *hungry* child. His appetite is good, and he is not over-capricious about his food. On the other hand, the child with a "finicky" appetite presents a real problem to his parents. There appear to be two reasons which account for such a condition—

(1) A lack of physical well-being;

(2) Spoiling, or mismanagement of the child.

The Sick Child

The child who is not well physically should not be forced to take food against his inclination, because during illness the digestive capacity is lowered, and the refusal of food is Nature's signal that it is not required. During teething or a nervous digestive upset it is a wise plan to reduce the amount of food given to the baby or "toddler." Any deficiency in the quantity of food can be compensated by extra fluid in the form of warm boiled water or diluted fruit juice. As the sickness decreases the appetite will improve.

The "Spoilt" or "Mismanaged" Child

This type of child early discovers that in the refusal of his food he possesses a very effective means of bending his family to his will. He has only to hold out long enough, and finally the whole family is ready to coax or bribe him. Such capitulation becomes a source of pleasure and interest to the child. The mother becomes anxious at his going short of food, and so resorts to the giving of extra sugar or unsuitable dainties to take the place of plain, wholesome food. Thus, we find that mothers themselves create their own problems, by too much solicitude and undue attention to the child.

The methods for dealing with these little people are a matter for the parents themselves.

Start Rightly

It is important to start early to form good eating habits. This includes regular feeding from birth, and no sugar, or sugar extracts such as malt, honey, glycerine, etc., should be given to the baby.

Before weaning time approaches, baby should be accustomed to the taste and feel of water, also various fruit or vegetable juices, given with a spoon and later from a cup. Then he should learn the "feel" of solid foods by the introduction of various cereal foods, i.e., barley, wheatmeal or oatmeal jellies. Teach the child to take each new food that is given him, and be very careful not to impress

your own dislikes of certain foods by suggestion or example. Give the food as naturally and yet as firmly as possible, and ignore any of the child's so-called "likes and dislikes." Certainly never talk of them in the child's presence, and never let him have the satisfaction of knowing that his fastidiousness has made an impression.

Lack of Sleep, and Irregular Habits

Many children suffer definitely from a lack of rest and sufficient sleep, and become sufferers of chronic tiredness. The little baby should sleep most of his time, and the "toddler" needs at least twelve hours in bed at night and two hours sleep during the daytime. Insist on regular rest and sleep. We often find that the child who will not sleep is the child who will not eat.

Constipation almost always causes poor appetite, and is, of course, fatal to good health generally. Mother must make sure of the daily bowel action of her children, and see that the motions are adequate and not hard or dry.

Outdoor exercise and fresh air are need for the "toddler," and it is necessary that ho should not live or sleep in stuffy rooms.

To Sum Up

(1) The "finicky" child needs three good, wholesome meals daily, with no sweets, biscuits or cakes between. His diet must include an abundance of fruit and vegetables, and he must have water to drink.

(2) Turn Off the Limelight.—It is frequently the good mothers, the conscientious, thoughtful ones, who have the most difficulty, as their very anxiety to do the best for their children imparts an element of emotion to matters of everyday life. In consequence, these matters are charged with undue importance and tend to set the child on the wrong track.

Children should eat their food under conditions of restfulness and contentment. They cannot derive the maximum of benefit from meals which are taken in an atmosphere charged with excitement and anxiety.

(3) Pay no attention to the child's refusal to eat certain foods, but give very small portions only. If there has been a lot of fuss over one particular item of diet, withdraw that altogether for a period. Then, in a matter-of-fact way, start again with a small portion, making no comment and no fuss. Carry on in this way, and you will find that the child will eventually learn to like most of the normal and wholesome foods.

(4) Cultivate a taste for simple foods, well cooked but not overcooked, and provide sufficient variety to prevent distaste arising as the result of monotony. These are both important factors in maintaining a healthy and normal outlook on the part of the child in relation to its diet.

(5) Remember, it is unnecessary and unwise to be overemphatic about non-essentials. The wise parent will be the one who has the tact to know when not to insist.

(6) Above all, do not talk about the meals or criticize the child's demeanour in his hearing. It is well to give a certain amount of praise where it is warranted, but this is best done indirectly and rather casually. In this way he will learn to accept without question those things which are part of the daily routine.

(7) Parents should also look to their own appetites and food habits, so that their children, who are busy imitating them and adopting their modes of life, will have a proper example to follow.

A PAGE FOR THE COOK

By A. C. IRVINE, Mistress Domestic Science, Education Department

APPLE FRITTERS

4 ozs. flour
¼ teaspoon salt
1 egg white
1 oz. butter
1 gill tepid water
Slices of apple or any fruit
Sugar

(1) Sift flour and salt, and make a hole in the middle of the flour. (2) Pour in the melted butter and mix in a little of the flour to the butter with a little of the water. (3) Do this till all flour is worked in, and all the water, and beat well. (4) Beat egg white to a stiff froth and mix in. (5) Cover slices of apple with this batter and drop into blue smoking-hot fat and cook till brown. (6) Serve with castor sugar.

BOILED APPLE PUDDING (or any fruit)

½ lb. suet crust
8 apples
2 ozs. sugar
6 cloves
½ gill water

(1) Make suet crust and cut off a third. (2) Roll out large piece of pastry and line a basin or mould which has been buttered and sprinkled with sugar. (3) Peel and cut up apples and put in with sugar, cloves and water. (4) Wet edge of pastry. (5) Roll out the third and fit on top. (6) Tie a scalded, floured cloth on top. (7) Plunge into boiling water and cook 3 hours. (8) Serve with a table napkin wrapped round basin on a plate.

STEWED FRUIT

1 pint water
Fruit
2 ozs. sugar

(1) Bring water and sugar to the boil, and add fruit, and simmer till soft. (2) Pour into fancy dish.

MARSHMALLOW PUDDING

½ oz. gelatine
½ pint water
½ lemon rind
Juice of 1 lemon
3 ozs. sugar
Pinch of salt
3 egg whites
Boiled custard

(1) Cut up gelatine and soak in the water with thinly-peeled lemon rind, sugar and salt. (2) Dissolve gelatine over fire, strain and let cool. (3) Add lemon juice, stiffly-beaten egg whites, and beat with a lifter till beginning to set. (4) Pour into a wet mould to set. (5) Turn out and serve with custard made from the egg yolks.

CLEAR LEMON JELLY

1 oz. gelatine
2 lemons
1 inch cinnamon stick
Little saffron
6 ozs. loaf sugar
1 pint water
4 cloves
2 egg whites and shells

(1) Cut up gelatine and soak in the water for half-an-hour. (2) Peel lemons very thinly and get out the juice and add them to the gelatine and water. (3) Add sugar, cloves and cinnamon stick. (4) Wash egg-shells before breaking them. (5) Get egg whites out and beat slightly and add the other ingredients with the crushed egg-shells. (6) Stand on fire and whip with lifter all the time till a deep froth appears. (7) When reaching boiling point, allow to simmer for 15 minutes or until the froth cracks. (8) Strain through a scalded jelly cloth or flannel. (9) Pour into moulds to set.

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The Tasmanian

Journal of Agriculture

Vol. VIII Tasmania, 1st August, 1937 No. 3

Editorial

THE PIG INDUSTRY

THE development in dairying which has taken place in Australia during recent years has been accompanied by a marked expansion of the pig industry—an expansion which, at the peak of the dairying season, has invariably resulted in low prices. Tasmania has not participated to any marked extent in the general increase in production; in fact, it would appear from statistical reports that a decline of from 17-20 per cent. has taken place as compared with production in 1931. Nevertheless, the market is consistently oversupplied at the height of the season, and in order to lighten the burden the Government has recently organised a scheme for the handling of pigs for export. Should this venture develop satisfactorily the position should in time show considerable improvement. The future of the industry will depend, however, even more than in the past, upon efficiency in production. The overseas markets demand a high-quality product of definite specification; though they can readily absorb our exports of pork and bacon they are well supplied, and will only pay the highest prices for products that satisfy the requirements of the trade.

The adoption of efficient and economical methods of management is a primary necessity if pig-keeping is to return a satisfactory profit. It is a recognised principle in industry that the maximum of efficiency and a rigid exclusion of all preventable waste are the first essentials in meeting reduced prices or intensive competition, and this principle applies with equal force to every phase of agriculture. Though an export industry may be expected, when fully developed, to stabilise prices to a considerable extent, the fullest advantage of enhanced market conditions will only be secured by thoughtful and capable husbandry.

There is, perhaps, no phase of land pursuits that offers greater scope for profitable production, and which yet suffers to a greater extent from casual management, than pig-keeping. Such is particularly evident in cases where it is carried on as a sideline—as it frequently is — to a major line of enterprise which yields unsaleable products such as separated milk and unmarketable potatoes and apples, etc. That such a position exists is due, in many instances, to the common belief that the pig is a hardy animal, able to live unaffected by hardship and squalor, and to thrive on a diet of inferior foodstuffs or one lacking in balance. It is true that pigs can live and fatten under such conditions, but only by excessive expenditure of food materials.

It is likely that, in the great majority of cases, errors of management are committed quite unwittingly and that an appreciation of the position will be all that is required to set in train the necessary remedial measures. Undoubtedly, incorrect feeding and bad housing conditions are the principal sources of bad economy, and a critical examination of these phases of management is recommended to producers who have in the past experienced unsatisfactory results.

The question of feeding is one which will well repay careful study. It is possible, without actually overfeeding, to waste large quantities of useful foodstuffs, simply because of the fact that certain basic principles, quite simple of understanding and application, have not been observed. These principles were dealt with in some detail in the August, 1936, issue of this journal, and a careful study of the article concerned is commended to all pig producers. Briefly, the principles are governed by the necessity for combining foodstuffs which contain different elements of nutrition, in suitable proportions to give the maximum amount of growth and condition in the shortest time. The feeding singly of one kind of foodstuff, such as separated milk, or potatoes, or barley, is a highly wasteful practice and one which leads certainly to uneconomic production. On the other hand, these are excellent foods when suitably combined or when used with other substances rich in the particular elements lacking in one or the other. The necessity for the observance of these principles cannot be too strongly emphasised.

Few people who are familiar with pig-housing conditions in this State would assert that the average standard is a high one. Well-built sties providing plenty of room with adequate shelter and proper ventilation are the exception, as also are well-drained yards and a reasonable regard for proper sanitation. The pig will tolerate much in the way of privation, but it cannot be expected to thrive

and return a handsome profit unless it is able to live under conditions of comparative comfort, cleanliness and contentment. Keeping pigs in cramped, exposed and dirty quarters is almost as wasteful an influence as inadequate or improper feeding, and in many instances the position calls for a greater recognition of this fact.

The question of breeds and breeding is intimately bound up with economic production. Upon it depends the type and weight of carcase supplied, both factors that assume a considerable degree of importance in the judgment of the British pork and bacon trade, as well as in that of the Australian buyer, who, though perhaps somewhat less exacting in his requirements, nevertheless has a decided preference for carcasses that yield choice cuts with the minimum of waste. It is a fortunate chance that the breeds preferred in England are well adapted to Tasmanian conditions, and those who may seek to supply overseas markets in the future will be acting wisely if they pay due regard to the preferences of the trade in this respect. The concept of breeding from pure-bred stock is gaining ground in Tasmania, and its extended application, together with an appreciation of the need for using breeding animals of proved performance, will be greatly in favour of larger and better litters.

Pig-keeping is a logical companion activity to dairying and mixed farming generally, and, carried out under conditions of proper management, it represents a valuable sideline. The average pig population of the State is in the vicinity of 45,000, and, while no definite figures are available concerning its value, £100,000 a year would probably not be an unduly high estimate. As an industry it is well worth fostering, but if it is to be maintained in a thriving condition it must satisfy the requirements of the market and at the same time show a satisfactory profit to the producer, both of which conditions are capable of fulfilment if efficiency in production and quality of output are safeguarded.

RECENT RESEARCH ON PASTURE MIXTURES AND GRAZING MANAGEMENT

By R. H. BEVIN, Chief Agronomist, and E. F. FRICKE, Agronomist

WITHIN the last few years there has been a definite trend towards sowing a smaller number of grass and clover species in mixtures than was previously considered necessary. The chief reason for this trend would appear to be that with greater knowledge of the performance of each species on any soil type we can select those which will be the most productive or the most permanent.

In many cases the previous sowing of a complex mixture containing a large number of species has given information on these points, by indicating which species become dominant in competition with others. Species that possess the ability to become dominant are likely to be either the most productive, as observed by Bruce Levy,[1] or the most long-lived under those conditions.

The complex mixture still has its place in primary sowings, particularly where variations in soil and other conditions occur in patches too small to be treated separately, but its value as an indicator of what species should be sown must be regarded as limited.

Recent experiments on the management of mixed pastures throw a new light on the factors governing the competition between different species in the sward. The work of Martin Jones[2] at Jealott's Hill indicates that the control of grazing can be of more importance in determining the predominance of any one species in a mixed sowing that any other single factor.

The pasture on which the experiments were carried out consisted chiefly of ryegrass, cocksfoot, white clover and red clover. It was divided into sections, each of which was given a particular kind of grazing management. By grazing heavily in the spring and lightly in the summer, it was found that the grasses were reduced and that the clovers were increased. The reverse treatment—light grazing in the spring and heavy grazing in the summer—caused the grasses to dominate the clovers. This was found to be due to the time at which growth began after winter. The grasses started active growth first, and, being vulnerable in the early stages of growth, were weakened by the heavy grazing in the spring. Competition with the later-growing clovers was thus reduced and a rapid development of the clovers followed. When the pasture was not grazed heavily in the spring the grasses grew very vigorously and prevented the clovers from developing when their active growth period became due.

A further refinement was then introduced by arranging an early and a late spring grazing, together with an early and a late autumn grazing. This enabled the individual grasses and clovers to be

favoured or repressed separately. It was thus found possible to produce from the original mixed pasture a ryegrass dominant pasture, a cocksfoot dominant pasture, a white clover dominant pasture and a red clover dominant pasture, solely by controlling the periods of grazing and resting in each case.

Another section of the pasture was overgrazed in the winter and undergrazed in the summer—a practice common on farms. The result was an invasion of weeds, particularly those of the prostrate type. The explanation is based chiefly on the fact that with the heavy winter grazing the sward did not become dense enough to force the prostrate growing weeds into an erect habit which would naturally facilitate their being eaten along with the rest of the herbage. Understocking in the summer then allowed the stock to leave the weeds untouched and graze almost entirely on the grasses and clovers, thus enabling the weeds to compete favourably with the grasses. Further, the openness of the sward favoured the establishment of weed seedlings.

It was later demonstrated that all the above processes could be reversed by changing the time and intensity of stocking. The pastures with one species dominant were changed back to mixed pastures. The pastures into which weeds and inferior grasses had become dominant were brought back to their original composition.

It is thus apparent that in grazing management we have a means of controlling pasture composition or of preventing pasture deterioration. Hence grazing management is considered to be of at least equal importance with manuring and soil fertility. The types of management chosen, though intensified in the experiment, are representative of the methods of stocking adopted on the farms in Great Britain. Where it was previously considered that the soil determined what species persisted after a mixed sowing, it was shown in these trials that the management of the stocking was the main factor.

It frequently happens in Tasmania, particularly where a systematic method of utilising paddocks has been adopted, that one or more paddocks reach a more or less stable composition. An example is cocksfoot and subterranean clover cut for early hay and the aftermath grazed. If this type of management results in these two species becoming dominant, it is obviously of little use including other permanent species in the mixture when sowing down a paddock for such a purpose.

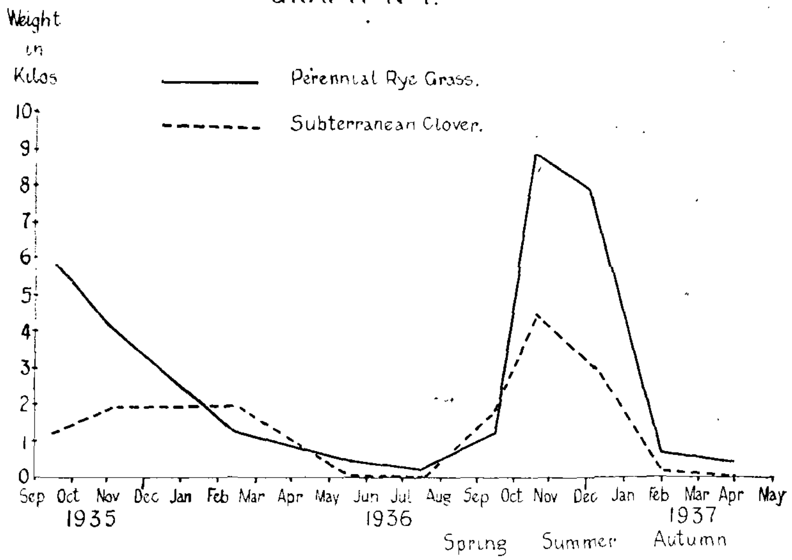
We thus develop naturally to the objective of sowing down paddocks with special mixtures designed for particular purposes or for adaptation to certain treatment.

The fact that the various grasses and clovers vary in their growth cycles suggests that if possible each one should be grazed at the time when it is producing most abundantly and when it can best withstand grazing. This is not possible for all species of grasses and clovers in a mixed pasture, but the fewer the species the more easily can it be attained. As we are bound to have both grass and clover in the sward to establish a nitrogen balance, the ideal would seem to be to concentrate on one grass and one clover as the mainstay for each paddock. For simplicity in management

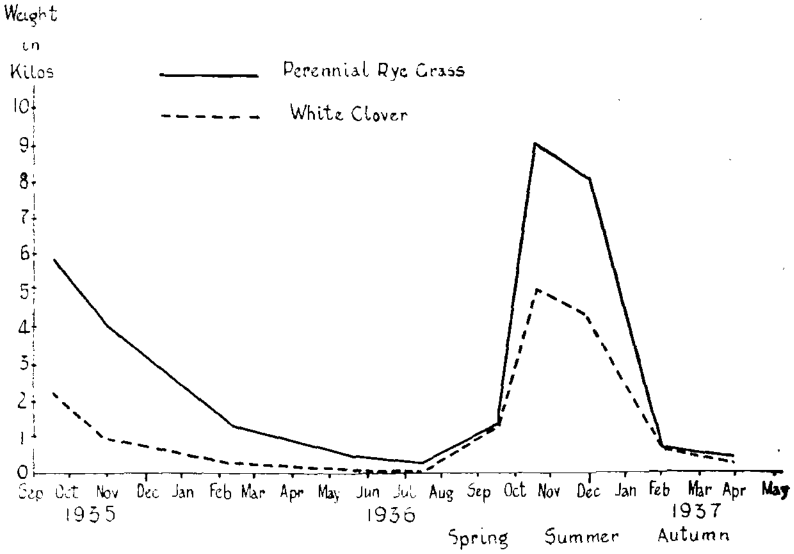
a grass and a clover having similar growth periods should be chosen, especially where grazing is to be the only method of utilising the pasture.

Some information on the seasonal growth of certain grasses and clovers is available from an experiment being conducted at Strathroy. A series of replicated broadcast plots of grasses and clovers was sown in 1935. They were laid out in duplicate areas to be grazed and cut alternately according to the method developed by Hudson.[3]

GRAPH No 1.



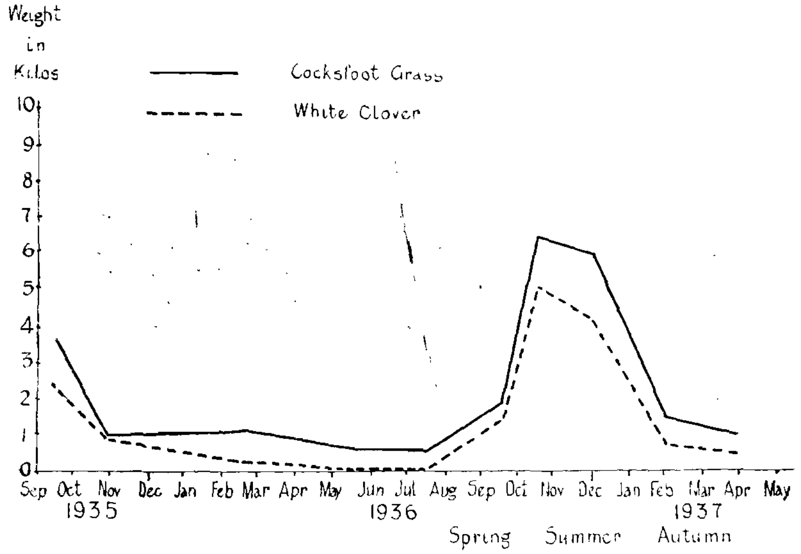
GRAPH No 2



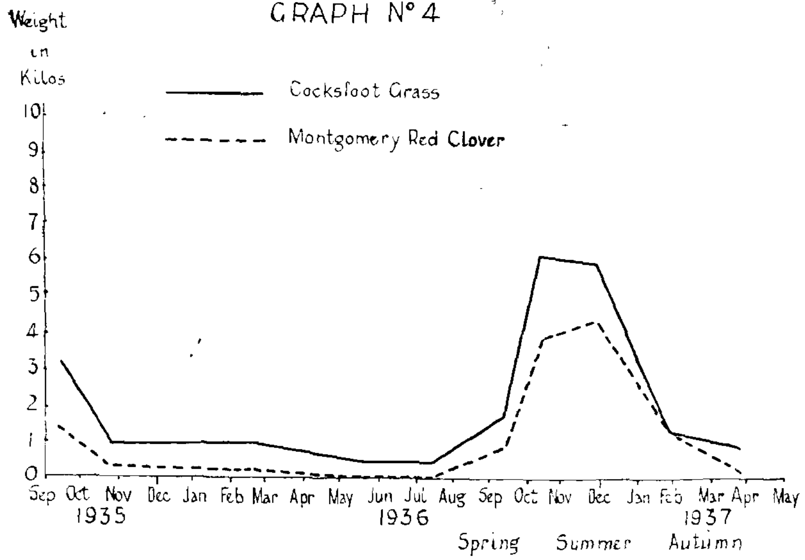
A series of yields over two seasons has been obtained, but as the first season was chiefly one of establishment the second season —1936-37—is of most interest for the present purpose.

The seasonal growth for the more important species is shown graphically below. The yield at each cutting was plotted on a monthly time scale and the curve was smoothed by joining mid-points. Each graph consists of two curves, one showing the seasonal growth of a grass and the other showing that of a clover having a similar growth period.

GRAPH N°3



GRAPH N°4



In graph No. 1 we have perennial ryegrass and subterranean clover. It will be noticed that in the 1936-37 season the subterranean clover commenced active growth in the early spring before the ryegrass and finished growth considerably before it in the summer. These two species balance fairly well in the winter and spring, but of course cannot be expected to do so in the summer when the clover dies off.

In graph No. 2 perennial ryegrass has been grouped with white clover. The two growth periods combine well both at the beginning and at the end of the active growing period during the season 1936-37. The comparatively slow establishment of white clover is shown by the divergence of the two curves in the 1935-36 season.

Graph No. 3 shows cocksfoot grass grouped with white clover. Here the growth periods combine fairly well, but there is a marked difference in the autumn growth, the cocksfoot maintaining its productivity while the white clover was definitely on the wane. It appears, however, that early autumn grazing should be effective on a mixture of these two species.

In graph No. 4 cocksfoot is grouped with Montgomery red clover. The autumn growth of the latter corresponds much better with cocksfoot than does white clover. The spring production of the Montgomery red clover is, however, below that of cocksfoot. Early spring grazing should help to maintain the balance on a pasture consisting of these two species.

In the above experiment the grasses and clovers were grown separately, and it cannot be assumed that their performance would be the same when grown together. The natural tendency of each species is shown, and it is likely that these tendencies would be unaffected if the species were sown together. The management of the combination to exploit the differences in growth period between the species is suggested, but it must be the subject of further experiment.

In addition to time of grazing there is also the question of the intensity of grazing. Ryegrass and white clover appear to withstand frequent heavy grazing, while cocksfoot and red clover seem to respond to less intensive treatment. Obviously, species favoured by the same type of grazing should be sown together.

If we combine all the above species in a mixture with the idea of producing a continuous supply of feed in the one paddock, the result generally is a suppression of the later growing species by the earlier ones. Soil exhaustion by the early growing species may occur. Early feed is produced, but late feed is below expectation. Other grasses such as Timothy and Phalaris tuberosa are also susceptible to competition from early growing species, and it seems that if we are to make full use of their special qualities we must sow them separately and give them individual treatment.

Finally, there is the fact of differences in palatability. In a complex mixture the most palatable species, and those present in smallest quantities, receive most attention from stock. Such species, *e.g.*, prairie grass and Timothy, are thus reduced to the

advantage of the other less palatable and more abundant species. It would, therefore, seem of little value to include more than one of such species in the one mixture if permanence is desired for all.

The importance of grass and clover balance, irrespective of species, must also be emphasized. The practice of top-dressing with superphosphate, which is becoming an economic necessity on most of our soils, has brought with it an excessive growth of clover in many cases. This excess is known to cause stock troubles such as pulpy kidney in sheep and bloat in cattle, and is at least suspected as being a contributing cause of feed taint in milk and cream. The farmer has in most cases to wait for several years until this clover phase builds up an excess of nitrogen in the soil and thus gradually restores the balance of grasses. The result is often then a disappearance of the clovers for some years. The question is, can we prevent these violent fluctuations in the composition of our pastures? Recent research as outlined above suggests that by a study of the growth cycles of our pasture species, methods of management would be developed which should allow a much better balance to be maintained between them in the sward.

There remains one more aspect of grazing management—the effect of time of grazing on the pasture as a whole. It has been observed that pastures rested at certain times of the year will produce more useful quantities of feed at a later period. For example, a pasture rested in the autumn will produce more than usual during the following winter. It has been suggested by Jones that this growth is made up of nutrients previously stored by the plant in the roots and leaf bases. It may also be due to the penetration of roots during the autumn to a warmer layer of soil. In any case, this out-of-season growth does occur, not only in pastures but in forage crops. A proper understanding of the production of such out-of-season pasturage or forage should do a great deal toward lengthening the grazing season, or, to be more exact, toward spreading the available fodder in a grazable form over a longer period.

REFERENCES:

[1] Levy, E. B.: Observations Relative to Pasture Seeds Mixtures—N.Z. Jour. Agr. 53, No. 5, 1936.

[2] Jones, M. G.: Grassland Management and Its Influence on the Sward—Empire Jour. Exp. Agric., i, ii, iii, and iv, 1933.

[3] Hudson, A. W.: Measurement of Pasture Production—Imp. Bur. Plan. Gen. Herb. Pl., Bulletin No. 11, 1933.

SOUTHERN TOBACCO TRIALS, SEASON 1936-37

By D. H. MALCOLM, Senior Agricultural Officer

DURING the past season the work of investigating the effect of various fertilisers on yield and leaf quality was continued at Bushy Park, while in addition a variety trial was established and a plot designed to afford information regarding the spread of virus diseases was also laid out. At New Norfolk an area for seed production and plant selection was established.

Soil Type and Seasonal Conditions

The soil type on which the trials were conducted was a light sandy loam of alluvial nature, usually regarded as being one of the most suitable soil types in the Derwent Valley.

Seasonal conditions were unfavourable in the early part of the season, the spring being unusually cold. Growth up to the New Year was therefore slow, and the crop suffered from severe windstorms which occurred frequently from transplanting until early in January. The crop was irrigated once during the second week in January, but shortly afterwards soaking rains were experienced which prolonged the growing period and resulted in yields considerably above the average, and a proportion of heavy, coarse-textured leaf.

Fertiliser was applied to the area at Bushy Park on October 22nd and transplanting took place on November 18th and 19th. At New Norfolk planting took place on November 24th, and on both areas misses were replanted on December 8th. Harvesting commenced on March 1st and was completed on April 13th, four pickings of leaf in all being made. The fertiliser and variety trials were laid out on the randomised block system, each block consisting of a single row of 50 plants. There were five replications of each treatment. Plants were set 2ft. 2in. apart in the rows, and rows were 3ft. 8in. apart. In the case of the fertiliser trial, furrows were opened on the site of each row and the correct manure broadcast therein. On the balance of the trials the fertiliser was broadcast over the whole area.

(a) Manurial Trial

This trial was designed to test increasing quantities of superphosphate applied as a straight fertiliser, and also increasing quantities of nitrogen and potash in combination with a fixed quantity of superphosphate. The following table sets out the quantities of fertiliser applied, together with the yields per acre, and the percentage of various grades of leaf secured from the different plots. As is usual with the tobacco crop, the fertiliser treatment is expressed in percentage form. Thus, a 3-8-4 mixture indicates that a fertiliser mixture containing 3 per cent. nitrogen, 8 per cent. phosphoric acid and 4 per cent. potash was used. In this experiment half the nitrogen was in the form of dried blood and half as sulphate of ammonia. Phosphate was applied as 22 per cent. superphosphate, and potash in the sulphate form. In all cases the application of mixed fertilisers was at the rate of 1,000 lbs. per acre.

TABLE 1: TOBACCO MANURIAL TRIAL

FERTILISER TREATMENT: PERCENTAGE OF EACH ELEMENT			FERTILISER TREATMENT: EQUIVALENT DRESSING (in lbs. per acre) of STANDARD FERTILISER					GRADED LEAF: PERCENTAGE OF EACH GRADE				
Nitrogen	Phosphate	Potash	Dried Blood	Sulph. Ammonia	Super-phosphate	Sulph. Potash	Yield per Acre	Bright Mahogany	Mahogany	Green	Reject	Damaged
—	10	—	—	—	454	—	1018	53.3	30.5	4.8	8.3	3.1
—	15	—	—	—	680	—	1378	52.1	32.7	4.3	8.0	2.9
—	20	—	—	—	909	—	1344	55.2	33.1	5.5	5.0	1.2
2	15	—	133	49	680	—	1421	51.7	32.6	4.1	5.6	6.0
4	15	—	266	98	680	—	1483	46.4	41.4	3.6	8.6	—
—	15	4	—	—	680	83	1139	60.5	25.2	1.8	3.6	9.1
—	15	8	—	—	680	166	1159	53.7	38.2	1.7	6.4	—
—	15	12	—	—	680	249	1387	55.1	31.0	2.4	5.9	5.6
3	15	4	200	74	680	83	1312	41.8	37.8	3.2	8.6	8.6
3	15	8	200	74	680	66	1490	51.3	36.5	2.9	4.3	5.0

Discussion

In examining the results of the trial it will be found convenient to take each series of treatments separately in the first instance. Thus, with the straight superphosphate group it will be seen that the 0-15-0 treatment gives the highest yield, although the percentage of bright leaf is slightly lower than either of the other two treatments in this group. Unfortunately, however, when the bulk was opened for grading it was found that portion of the leaf was mouldy. The percentage so affected is shown in each case as "damaged." This leaf, obviously, could not be graded, and for this reason a comparison of the various grades does not accurately reflect the results.

In the nitrogen plus super group it will be noticed that, although yield is increased, there is a significant falling-off in the proportion of bright leaf, particularly where a 4 per cent. dressing of nitrogen was applied.

With the potash plus superphosphate group, increased yields and quality have been obtained by the use of increasing quantities of potash, and it would appear that the heavy dressing is the most profitable.

Where a complete fertiliser has been applied it will be noticed that a dressing of 4 per cent. potash has been insufficient to counteract the depressing influence on leaf quality of 3 per cent. of nitrogen, but where the potash dressing has been increased to 8 per cent. both yield and quality have been improved.

The following table gives a comparison of the best results obtained in the respective series:—

TABLE 2

Fertiliser Treatment	Yield per Acre (lbs.)	Bright Mahogany %	PERCENTAGES OF GRADED LEAF			
			Mahogany	Green	Reject	Damaged
0 - 15 - 0	1378	52.1	32.7	4.3	8.0	2.9
2 - 15 - 0	1421	51.7	32.6	4.1	5.6	6.0
0 - 15 - 12	1387	55.1	31.0	2.4	5.9	5.6
3 - 15 - 8	1490	51.3	36.5	2.9	4.3	5.0

On analysing the above figures it will be seen that the highest percentage of bright leaf is obtained from a 0-15-12 dressing with a yield of 55.1 per cent. in the bright grades. The highest yield was obtained from a complete fertiliser, with 51 per cent. of bright leaf. It is felt, however, that in the light of present knowledge it would be unwise to recommend a complete fertiliser. It is believed that an improvement in quality could be obtained by decreasing the nitrogen to 2 per cent. and increasing the potash to 12 per cent., and it is proposed to test this formula during the coming season.

After considering the results of the trial in relation to experiments in past seasons, it is recommended that farmers in the Derwent Valley should use a dressing of 6 cwts. superphosphate and 2 cwts. sulphate of potash on their tobacco fields during the coming season.

Variety Trial

In this trial a dressing of 1,000 lbs. per acre of a 0-15-8 fertiliser was used. The following table gives details as to the results obtained.

TABLE 3

TOBACCO VARIETY TRIAL

Variety	Percentage of Plants Established	Yield per acre (lbs.)	GRADED LEAF PERCENTAGE EACH GRADE							
			BM1	BM2	BM3	IB	M1	Green	Reject	Damaged
Bonanza	95	1260	3.8	27.6	35.3	22.8	8.6	—	1.9	—
Jamaica	86	876	4.1	27.4	32.9	20.5	10.9	—	1.4	2.8
Gold Dollar	82	1056	15.9	31.8	22.7	20.5	5.7	—	—	3.4
Sport	94	1548	3.1	32.6	20.2	31.0	7.8	.7	1.5	3.1
White Stem Orinoco	97	1044	1.1	9.2	30.0	32.2	25.3	—	2.2	—
Cash	69	576	8.3	20.8	25.0	39.6	6.3	—	—	—
Hickory Pryor	96	1356	11.4	35.1	24.6	12.3	10.5	—	3.5	2.6

Discussion

An interesting feature of this trial is indicated in the column relating to the percentage of plants established. It will be noticed that Bonanza, Sport, Hickory Pryor and White Stem Orinoco transplanted particularly well, while Gold Dollar and Jamaica were fair, and Cash was definitely poor. In this connection it may be of interest to record that in the seed-bed Bonanza, Gold Dollar and Sport made phenomenally rapid growth, while Cash and Orinoco were very slow. There were marked differences in the size of the plants of the different varieties when transplanting took place. Yields in all cases were exceptionally high, and it will be noticed that there is no green leaf—the result of picking when the leaf was fully ripened.

The outstanding varieties are undoubtedly Gold Dollar, Sport and Hickory Pryor. Gold Dollar, which is a selection from Jamaica, yielded 15.9 per cent. of BM1 leaf as against 11.4 per cent. from Hickory Pryor and 3.1 per cent. from Sport. Further, it yielded no green grade or reject leaf, while Sport yielded .7 per cent. and 1.5 per cent. respectively, and Hickory Pryor nil and 3.5 per cent. It should be noted that the 3.5 per cent. of reject leaf obtained from Hickory Pryor would amount to 47 lbs. on a yield of 1,356 lbs. per acre.

FIG. I

SECTION OF VARIETY TRIAL
Gold Dollar and Sport

The Gold Dollar leaf was particularly fine textured, very bright in colour, and was easily the most attractive of the various varieties. Unfortunately, like Hickory Pryor, it seems susceptible to wind damage. Sport, on the other hand, is highly resistent to wind, and despite the unusual severity of the gales this season was almost undamaged.

Subjected to smoking tests Gold Dollar burns well, with a good ash, and is neutral both in flavour and aroma. It should be readily acceptable to the manufacturers. Sport, on the other hand, has a slightly foreign flavour and aroma, and its cultivation cannot at present be recommended.

It is suggested, however, that Gold Dollar will probably prove superior to Hickory Pryor in the Derwent Valley and at Scottsdale, and growers are advised to try this variety in their fields next season.

Virus Block

With the object of obtaining information relative to the transmission of both Spotted Tomato Wilt and Mosaic, a block of 1,000 plants was set out in 20 rows, each of 50 plants. The variety employed was Hickory Pryor, and 1,000 lbs. per acre of 0-15-8 fertiliser mixture was used.

Careful record of all cultural work was kept, and all operations were carried out in the same sequence in respect of the various rows and in the same direction in any one row.

Weekly counts were made of all plants and those showing symptoms of Wilt or Mosaic carefully recorded. Thus it was hoped to trace the direction and spread of any particular outbreak.

The comparative freedom from both these diseases during the past season, however, resulted in very little information being collected, and in this respect the work was disappointing.

Counting ceased when harvesting was commenced, and a plan of the plot showing the position of the plants and the date at which the symptoms were first noticed was sent to the Council for Scientific and Industrial Research for analysis.

The following is an abstract of notes supplied by Dr. J. G. Bald, of that body:—

"*MOSAIC* was first recorded on two plants on December 30th. The plants stood side by side in row 13, and of sixteen plants subsequently infected, twelve were in that row.

After the first two infections about four weeks elapsed before the next were recorded; then, on January 26th and 29th, five plants were found diseased in row 13 to the south of the first two, four to the north, and one in row 11. Infection appeared to be carried along the row. The virus was possibly transmitted during cultural operations, but which operations it is hard to say. The infections on the south side were not due to disbudding or suckering, as row 13 was worked from south to north. If the virus were transmitted by hoeing, the plants recorded on December 30th would need to have contained a high concentration of virus nearly three weeks before symptoms showed, and the incubation period of the virus in the plants infected at the end of January would have been about seven weeks.

It is possible that the virus was carried by someone walking between the rows and brushing alternately against the leaves of diseased and healthy plants.

SPOTTED WILT.—The infection occurred mainly in four rows on the western side of the plot; evidently the source of infection was on that side. The diseased plants were confined until February 4th in the southern two-thirds of the plot and were widely scattered. There seemed to have been no tendency for adjacent plants to become affected.

One would deduce from this distribution that transmission came from a little distance as infected plants were not found in groups round an infection centre, but that it did not come from far because infection was mainly confined to one section of the plot.

It is suggested that the source of infection may have been an adjacent crop of hops or weeds on the headlands of the field."

Seed Area

A seed area was planted on the Lachlan Park Hospital Farm, the varieties grown being Hickory Pryor, Gold Dollar, Jamaica and Sport. Careful selection of good type plants was carried out and a large quantity of clean seed has been obtained.

In the Hickory Pryor area several plants of distinctive type were specially selected and seed from these will be planted separately for trial during the forthcoming season.

These selections were based on shape of leaf, freedom from sucker growth, earliness of maturity and texture of leaf.

FIG. II
SEED SELECTION AREA, NEW NORFOLK

Acknowledgment

It is desired to acknowledge the very generous measure of assistance and co-operation afforded by all who were concerned with the various aspects of the work referred to in this report.

AN OMISSION

In the list of growers of Certified First Harvest Brownell Seed Potatoes published in the last (May) issue of the Journal, the name of Mr. E. L. Blizzard, Lileah, was inadvertently omitted. This was the result of an oversight in compiling the list, and those interested are requested to note the inclusion of Mr. Blizzard's name.

THE LIGHT-BROWN APPLE MOTH *
(TORTRIX POSTVITTANA, Walk)

By J. W. EVANS, Entomologist

Introduction

IN certain apple-growing districts within the State, considerable injury is occasioned to fruit by caterpillars of the Light-Brown Apple Moth.

These caterpillars, which are known locally as "Green Grubs," and sometimes as "Looper Grubs," are not abundant every season. On this account, and because of their apparent resistance to sprays, control measures have in the past been largely unsuccessful.

Under Tasmanian conditions two generations occur in orchards, but the caterpillars of only one generation injure apples. Moths that occur during November and December lay eggs which give rise to the caterpillars, and the latter feed on apple trees from late November until the end of February. This is the generation responsible for the damage to fruit. In late February, March, and early April, moths are again in evidence, but the caterpillars that hatch from the eggs laid by this brood of moths are seldom noticed.

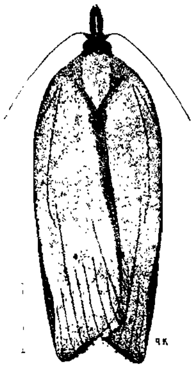


FIG. I
THE LIGHT-BROWN APPLE MOTH

Life History

This account of the life-history of the Light-Brown Apple Moth begins with the brood which is present in orchards during the early summer months. The moths, which are pale brown in colour, are less than half-an-inch long when resting with their wings folded. They are more frequently seen than the Codling Moth, and if

*A more comprehensive paper concerned with this insect has been published as a supplement to this issue of the Journal. Copies are available (free) at the Department of Agriculture, Hobart and Launceston.

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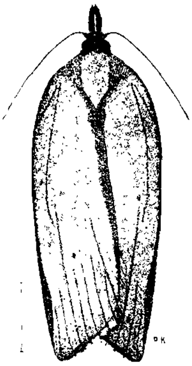

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disturbed will make short erratic flights. Eggs are laid on apple leaves in batches of about twelve. They are pale green in colour and almost flat, which renders them difficult to see. On hatching they give rise to minute caterpillars which feed principally on the undersides of leaves. The caterpillars at this stage construct silken tunnels, lying alongside the veins or the midrib of leaves, under cover of which they feed. After about three weeks they abandon their tunnels and burrow into curled leaves or roll round themselves the edge of a tender leaf.

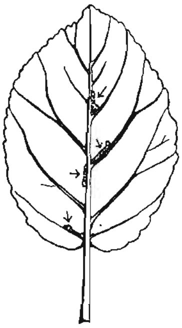


FIG. II
LOWER SURFACE OF AN APPLE LEAF
Showing the tunnels made by caterpillars

It is not until early in January, in most seasons, that their presence is noticed in orchards. During this month the growing shoots begin to assume a ragged appearance and curled leaves become abundant.

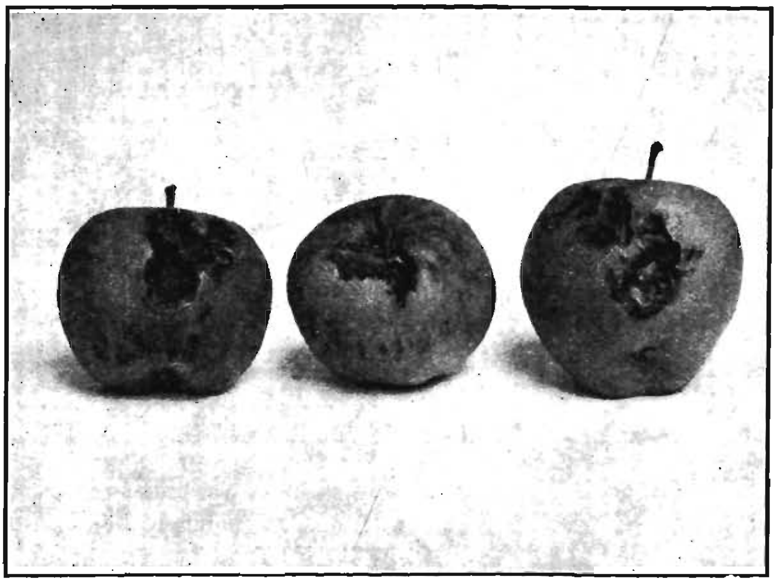


FIG. III
APPLES INJURED BY CATERPILLARS OF THE LIGHT-BROWN APPLE MOTH

Towards the end of January and during February, injury to fruit is caused by caterpillars feeding between two adjacent apples or between an apple and a leaf. The damage consists of surface blemishes, ranging in size from small pits to very extensive markings.

When full-fed the caterpillars turn into chrysalids, remaining wherever they have been feeding previously and not entering the soil or hiding under bark. The chrysalis stage lasts some two or three weeks. In late summer the moths emerge and lay their eggs on apple leaves. These eggs take longer to hatch than those of the previous brood, because the weather is cooler at this season.

From the end of April, as long as leaves remain on the trees, small caterpillars may be found on the undersides of the leaves, and infested leaves can be recognised by the presence of small discoloured patches on their upper surfaces. When they fall, some of the caterpillars will feed on such weeds as may be available, or on cover crops if present, whilst others will survive on the orchard floor, without feeding, until the end of September.

As soon as the weather warms up in early spring and green shoots appear, the caterpillars climb the trees and feed on such growth as is available, and by the time the "pink-bud" stage is reached a large proportion of the blossom-clusters nearest to the ground will be infested. This brood of caterpillars complete their development late in October and give rise to the flight of moths with which this account of the life-history began.

Origin and Establishment of Infestations

Unlike the Codling Moth, which is an introduced insect, the Light-Brown Apple Moth is a native pest. The caterpillars feed on a wide range of plants, and infestations that develop in orchards are initiated by moths that fly in from outside. It is improbable that the number which enter an orchard in one season would be sufficient to bring about such an increase during the same season as would cause the moths to become apparent as a pest. It is likely that several seasons will elapse before control measures become necessary. Even when the pest is well established in an orchard the numbers will fluctuate from year to year, due to seasonal conditions and to the control exercised by parasites.

Control

It has been found that, whilst small caterpillars that feed on the lower surface of apple leaves are readily controlled by lead-arsenate, larger ones avoid poisoned foliage and are thus difficult to destroy. For this reason no purpose is served by adding lead-arsenate to the fungicide sprays applied at the "pink-bud" or "green-tip" stage.

An endeavour should be made to prevent caterpillars reaching the stage when they are able to curl leaves and feed on apples. Young caterpillars may be present on trees from the beginning of November, and the period they remain feeding under leaves is never less than a fortnight. It is therefore recommended that

in orchards known to be infested by this pest, from the calyx stage onwards five applications of lead-arsenate be given at fortnightly intervals; that a wetter be incorporated in the spray, and that all parts of the trees be covered, particular attention being paid to the under surfaces of the leaves and to growing shoots. In some years the growth of shoots will cease during December, and in others not until the end of January. Hence, as it is essential that these be kept covered with lead-arsenate until all growth has stopped, it may be necessary in some seasons to give an additional treatment to certain varieties at the end of January.

The use of ovicides (white oil with or without nicotine-sulphate) is not recommended, as their value depends on accurate timing or very frequent application. Also, oil sprays tend to cause the spray deposit to be retained on fruit in excess of the limit of tolerance.

Since neither the eggs nor the caterpillars occur on apple trees during the winter, no control measures can be taken at this season, but orchards should be kept as free from weeds as possible and cover crops should not be planted every year. Neither sound nor shrivelled apples should be left on the trees during the winter, and when practicable all leaves remaining in the first week in June should be removed.

Summer pruning, if practised solely as a control measure against this pest, is not advocated.

BROADCAST TALKS

"Man on the Land" Series—Tuesdays, 6.40-6.55 p.m.

From 7ZL and 7NT NORTH REGIONAL

6th July: TOBACCO GROWING. Mr. D. H. Malcolm, R.D.A., Senior Agricultural Officer.

13th July: COMMUNITY PACKING. Mr. P. H. Thomas, Chief Horticultural Officer.

20th July: POULTRY DISEASES. Mr. L. N. Thornton, B.V.Sc., Veterinary Officer.

27th July: FORGOTTEN FORESTS. Mr. Denis Butler.

3rd August: FEEDING OF DAIRY HERDS, AND PRODUCTION. Mr. R. W. Wilson, H.D.A., Senior Agricultural Officer.

10th August: GRASS AND CLOVER SPECIES. Mr. E. F. Fricke, Dip. Ag., M.Ag.Sc.

17th August: ORCHARD HYGIENE. Mr. T. D. Raphael, Dip. Hort. (Cantab.), M.Sc.

24th August: THE ROLE OF PARASITES: Mr. T. Philp, L.V. Sc., Chief Veterinary Officer.

31st August: FORESTS AND DESTRUCTIVE AGENCIES. Mr. F. Smithies.

28th September: THE COST OF FOREST DENUDATION. Dr. Pearson.

ORCHARD HEATING AND PREVENTION OF FROST INJURY

By T. D. RAPHAEL and H. A. TURNER, Horticulturists

OWING to the injury and loss caused by late spring frosts in certain apple and pear orchards in various parts of Tasmania, and in view of the recent advances which have been made in the matter of orchard heating as a means of prevention, it was decided to carry out some preliminary trials last September.

Accordingly, two orchards were selected—one in the North and one in the South of the Island—which had in past years suffered, severely at times, through September and November frosts. In an average orchard both apples and pears can tolerate, up to the full bloom period, temperatures as low as 29 degrees (*i.e.*, 3 degrees of frost). After this period, however, susceptibility to injury increases, as also does the necessity for some form of protection until danger of frosts is over. Naturally frosty areas are those which are well inland and on flats or in valleys where cold air collects and shelter belts or natural obstructions reduce the facilities for rapid air drainage. It is, therefore, desirable to avoid such areas in the first instance, though this is not, of course, always possible. Various remedial measures, such as circulating the air by means of huge fans, blanketing the orchard with smoke, and other methods have been tried, but the actual heating of the air by means of small oil or fuel burners distributed at intervals throughout the orchard area has proved by far the most successful

Equipment

In the Northern trials, which were carried out at Mr. F. S. Holmes' pear orchard at Spreyton, the following apparatus was necessary to equip one acre:—

1 "U" type electric thermometer.
300 feet of bell wire.
1 bell.
8 dry cells.
1 switch.
50 3-gallon oil burners complete with triangular baffles and lids.

Where larger areas are under consideration an additional electrical thermometer would probably be necessary, together with increased burners at the rate of from 40 to 50 per acre.

In the Southern trials, conducted on Mr. R. H. Marshall's apple orchard at Gretna, the following items were employed:—

1 graduated Short and Mason "U" type electric thermometer.
900 feet double bell wire.
1 bell.
2 dry cells.
2 batteries.
1 switch.
1 Sieman's relay.
50 3-gallon oil burners complete with baffles and lids.

reaching the terminal at 34 degrees, the electric bell rings in the house. The reason for choosing 34 degrees as the limit, instead of freezing point (32 degrees), is that some allowance of time is necessary to enable the grower to reach the orchard, check the temperatures on his interval thermometers and, if necessary, start the oil burners going. The unit of 40 to 50 burners per acre given above has been found sufficient to cope with any average spring frost by raising the temperature from 4 to 6 degrees, and is generally accepted as adequate and commensurate with the demands of economy. It is not necessary to raise the temperature above 34 degrees, and once this level has been reached it may be maintained by putting on the baffle plates (thus saving oil fuel), or even by putting out some of the burners.

FIG. II

THE LOCATION OF THE ELECTRIC ALARM THERMOMETER IN THE ORCHARD

The heaters with triangular baffle plates removed are also in position.

Particulars of the 1936 Experiments

In the trials conducted at Gretna the temperature fell below freezing point (32 degrees) on five occasions following the installation of the alarm, and the following details will give an idea of the routine adopted.

First Alarm—1st November (Full Blossom)

Alarm rang at 2.10 a.m. The temperature at 3.30 was 30 degrees, and still falling; burners were lighted with the dampers on. At 4 a.m. the central thermometer recorded 33 degrees; dampers were removed on every other burner, and a rise to 35 degrees was soon attained. At this period four thermometer recordings at

As already mentioned, the work at Spreyton was handicapped by the failure of the electric alarm thermometer which was used, though the heaters were lighted on one occasion and functioned satisfactorily, raising the temperature more than three degrees with the baffles in place. The heaters were ignited by means of a kerosene blow lamp, the 50 burners being started in 30 minutes. The amount of time required for the latter operation indicates the advisability of having the alarm thermometer set at a couple of degrees above freezing point, for in a large area it would take one or two men several hours to complete the initial lighting, and if the frost was severe, damage might occur before the proposed remedial measures had been completed. Work at Gretna demonstrated the necessity for raising the temperature rapidly to the safety margin by lighting with dampers off, and then regulating down to the economic level. When a cold air-drift is apparent or suspected, it is recommended that the number of heaters placed across the line of drift be doubled. This was done in the Gretna trials, where a fairly regular down-river airflow occurs.

No frosts of a wholesale destructive nature occurred in the past spring, and accurate data indicating the possible crop savings through the use of the heaters could not, in consequence, be obtained. However, some very useful data have been collected and the way has been paved to possible extensions of the experiments during the coming spring.

Costs

For those who may be interested, a few figures based on the work outlined and giving the approximate costs of installing frost protective measures on an average one-acre block of orchard are tabulated below.

ELECTRIC APPARATUS

	£	s.	d.
2 coils Bell Wire @ 5/-	0	10	0
Insulators, etc.	0	5	0
Electric Bell, 5/-; Switch, 1/6	0	6	6
3 Dry Cells	0	9	0
Relay	2	10	0
Electric Alarm Thermometer	3	0	0
4 Check Thermometers	1	0	0
	£8	0	6

HEATING APPARATUS

	£	s.	d.
45 3-gallon Oil Burners @ 3/-	6	15	0
1 ton Fuel Oil (approx. 250 gallons)	5	11	0
	£12	6	0
Approximate Total Cost of 1 Acre	**£20**	**6**	**6**
Approximate Total Cost of 5 Acres	**£67**	**0**	**0**

The equipment detailed above, together with the oil supply quoted, should provide immediate protection to an orchard, and would probably be sufficient for at least two average frosts. In actual practice it has been found that heaters regulated in the proper

manner will burn about eight hours. Commercial orchards still under cultivation in frost-liable districts in this State rarely experience more than one, or perhaps two, injurious frosts per season. It is unlikely, therefore, that fuel costs will be high, and as these are practically the only recurring expenses the total outlay may only be in the vicinity of £5 or £6 per acre per annum—a small premium to pay for 400 or more bushels of marketable fruit.

The fuel oil used, which had a specific gravity of .910 and a calorific value of 19,000 B.T.U., is quoted at £5/11/- per ton in returnable drums, f.o.r. Hobart. The construction of the electric apparatus, though not very involved, can be greatly simplified if the relay, dry cells, electric bell, switch and wiring are all compactly housed together in a box—an arrangement which can easily be carried out by the electrician to whom the order for apparatus is given. The actual wiring up of the thermometer and connections in the orchard will present little difficulty to the grower.

It is desired to acknowledge the assistance rendered by Messrs. Medhurst and Sons, and the Shell Oil Company, in the matter of electrical apparatus and fuel oil respectively, and the co-operation of Mr. R. H. Marshall, Gretna, and Mr. F. S. Holmes, Spreyton, on whose orchards the trials were carried out.

SOYA BEANS

A number of enquiries are being made regarding the possibilities of growing Soya beans in Tasmania.

For the last two years experimental plantings have been made with seed imported from England, but the returns from the crops have been most discouraging. The main cause of disappointment appears to lie in the fact that although the Soya bean plant grows quite well it fails to set seed in any great quantity. Future investigation into the growing of Soya beans will therefore be aimed at determining the best time of planting the beans in order to encourage the setting of seed before the plant dies off. So far plantings have been held over until fairly late in order to avoid the late spring frosts, but this year it is intended to make earlier plantings and risk the frost damage in the hope that the plants will survive and come to maturity in time for flowering and seed setting to be satisfactorily accomplished.

If the growing of Soya beans proves to be agriculturally possible in Tasmania, the next point to consider is the economics of the crop. The latest advices from England indicate that Soya beans were selling in London at about £7 per ton. This is approximately 4/- per bushel, and does not compare very favourably with grey peas at £10 per ton, or approximately 6/- per bushel. To get an equivalent return it would mean that the Soya bean should yield at least 8 to 10 bushels per acre more than do grey peas. On the other hand, with the development of industry in Europe at the present time, it is quite possible that the price for Soya bean products may rise to such an extent as to cause a definite increase in the value of the beans.

It is the intention of the Department to follow the trials carefully this year, in order to determine what policy it might be safe to advocate for the guidance of Tasmanian farmers in the future.

CALF MARKING SCHEME

By G. L. DAVIS, Supervising Herd Recorder

DURING the past season a calf marking scheme has been introduced by the Department of Agriculture in conjunction with Grade Herd Recording.

The object of the scheme is to permit the identification of heifer calves from cows of proved production capacity. Identification will be carried out by a system of tattooing.

The application of the system is expected to make a considerable number of marked heifer calves available within a few years. Farmers anxious to increase the size of their herds will then no longer be obliged to purchase stock on their appearance only and to pay top prices for springing heifers whose breeding and butterfat backing are unknown. Instead, if they are prepared to pay a little extra for marked calves, they will be obtaining potential dairy cows of assured value. In New Zealand calf marking has been carried out for a number of years and marked-calf sales are a regular feature in most dairying districts. At these sales marked yearling heifers command prices twenty-five to thirty shillings in advance of unmarked heifers of the same age.

This scheme is not an experiment, but is in line with the practice of the more progressive dairymen whose policy is to use pure-bred bulls of proved ancestry and to keep only heifer calves sired by such bulls from their best cows, all other calves being either destroyed or sold.

As milk and butterfat yields are inherited factors the practice of retaining only heifers from the highest producers in the herd is the logical method of herd improvement.

The three essential features of the scheme are—

Firstly— The dam of the calf must have proved herself a good producer by reaching the standard of production prescribed for cows of her age. (These standards are by no means low).

Secondly—The calf must be sired by a pure "bred for production" bull.

Thirdly— The Department must be satisfied that the calf has all the necessary qualifications, and a statutory declaration concerning parentage must be furnished if required.

Given these three guaranteed points, an intending purchaser will surely satisfy himself that the calf has the remaining essentials of a good dairy animal, namely, type and constitution.

The rules under which the scheme will be conducted are given below.

RULES

Calves Eligible for Marking

1. No calf shall be marked except that it be—

   (*a*) From a qualified dam—that is, from a cow which has been recorded under either the Grade Herd Recording Scheme or the Pure Bred Herd Recording Scheme, and has reached the standard prescribed for cows of her age at the time at which she was tested.

   (*b*) Sired by a bull registered, or eligible for registration, with a recognised Herd Book Society, and whose dam has been recorded under the Pure Bred Herd Recording Scheme, and has reached the standard prescribed for cows of her age at the time at which she was tested.

2. No records for qualification of dams under the Grade Herd Recording Scheme shall be recognised prior to the 1936-37 season.

3. No calf shall be marked unless the recorder is satisfied that it has the necessary qualifications regarding each parent, and the owner shall, if required by the Chief Dairy Officer, make a statutory declaration that, to the best of his knowledge and belief, the information supplied by him in regard to the breeding of the calf is true in every particular.

4. No calf shall be marked except it be owned by a member of the Grade Herd Recording Scheme.

5. All calves which it is intended to submit for marking must have an approved identification mark, applied by the owner within 24 hours of birth, and distinguishable by the recorder on his first visit. (An approved mark is to cut large Roman figures in the hair with ordinary scissors—thereto or in connection therewith)

Standards for Qualification of Dams

6. The following are the standards for the qualification of dams:—

   Two-year-olds: 210 lbs. butterfat in 273 days.
   Three-year-olds: 240 lbs. butterfat in 273 days.
   Four-year-olds: 270 lbs. butterfat in 273 days.
   Five-year-olds (and over): 300 lbs. butterfat in 273 days.

7. Should a qualified dam fail to reach the prescribed standard for two successive lactation periods, her name shall automatically be struck off the list; but she can again qualify if in a subsequent lactation period she again reaches the prescribed standard. In cases where a cow has qualified once, and then in a subsequent lactation period or periods fails to qualify, owing to sickness, disease, or injury, her name may, at the discretion of the Chief Dairy Officer, be kept on the list of qualified dams.

Application for Marking

8. Any herd owner who intends to submit a calf for recording shall make application on the prescribed form, and shall supply

the particulars required by that form; and no calf shall be marked until such form is completed.

Registration and Certificates of Registration

9. A certificate of registration shall be issued by the Department of Agriculture for each calf marked; and no calf shall be deemed registered until a certificate of registration is actually issued.

10. The Chief Dairy Officer shall cause a register to be kept, in which shall be entered particulars of registration, sire and dam of calf, the production of the dam, the number tattooed in the ear of the calf, and the date of birth.

11. Such register shall be available for inspection by any person during office hours.

System of Marking

12. The letter ⟨S⟩ shall be tattooed in the calf's left, or near, ear, and shall be followed by one of twenty letters, each letter to denote a particular year; thus—

⟨S⟩ A or ⟨S⟩ B., etc.

The letter S will indicate that it is a calf from a qualified dam, and the letter A will indicate that the calf was born in the 1936-37 season, and B that it was born in the following season, 1937-38.

The letters to be used are—

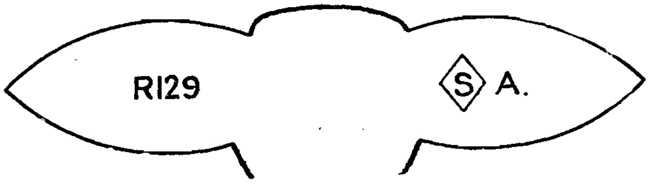
A B C D E H I J K L M P R S T U V X Y, Z

In the right, or off, ear the unit letter and the calf's number shall be tattooed; thus—

R129

This indicates that it is calf number 129 in the Ringarooma Unit.

Right, or Off, Ear Left, or Near, Ear



The accompanying sketch shows the tattoos that will appear in the ears of calf number 129 in the Ringarooma Unit born in the year 1936-37.

13. In the case of a calf sired by an approved bull from—

(a) A heifer on her first lactation period;

(b) A cow purchased and introduced into a herd which is being recorded;

(c) A cow in a herd which is being recorded for the first time—

such calf may be identified by placing a number in the left, or near, ear; thus—

A 7

This indicates that it is calf number 7 in this particular owner's herd in the year 1936-37. In the event of such calf being sold a further identification mark may be added, if considered necessary by the Chief Dairy Officer.

If and when the dam qualifies the <S> will be added to the left, or near, ear, and the unit letter and calf number will be tatooed in the right, or off, ear. The tattoo in the left, or near, ear will then appear thus—

<S> A 7

Time of Tattooing

14. All calves to be marked shall be tattooed within 35 days of birth. Any calf over this stage is not eligible to be marked, except in exceptional circumstances, such as delayed visit of recorder, etc. In all such cases special authority for marking must be obtained from the Chief Dairy Officer.

15. In any case where an application for making is received the Chief Dairy Officer may refuse such application without stating any reason, should he have any reasonable doubt as to the eligibility of the calf.

16. An appeal against the Chief Dairy Officer's decision may be made to the Director, whose decision shall be final. Any such appeal must be lodged within 14 days after notice of the Chief Dairy Officer's decision has been received.

17. In the event of a bull, other than an approved bull, being on the property or with the cows at or about the time of mating of the dam, the Chief Dairy Officer may refuse to register any calf.

Indemnity

18. No person who has submitted any calf or calves for marking and registration by the Department of Agriculture, or by any of its officers, herd recorders or servants, shall have any claim for damages, whether arising out of breach of contract, tort, or otherwise whatsoever, against His Majesty the King, the Government, or any person in the service or employment of His said Majesty or the said Government, for or in respect of any thing done or omitted to be done under or in connection with these rules, or the performance or non-performance of any act or duty thereunder, or in carrying out or attempting to carry out the marking and registration of any calf or calves, or for anything done or omitted in reference thereto or in connection therewith.

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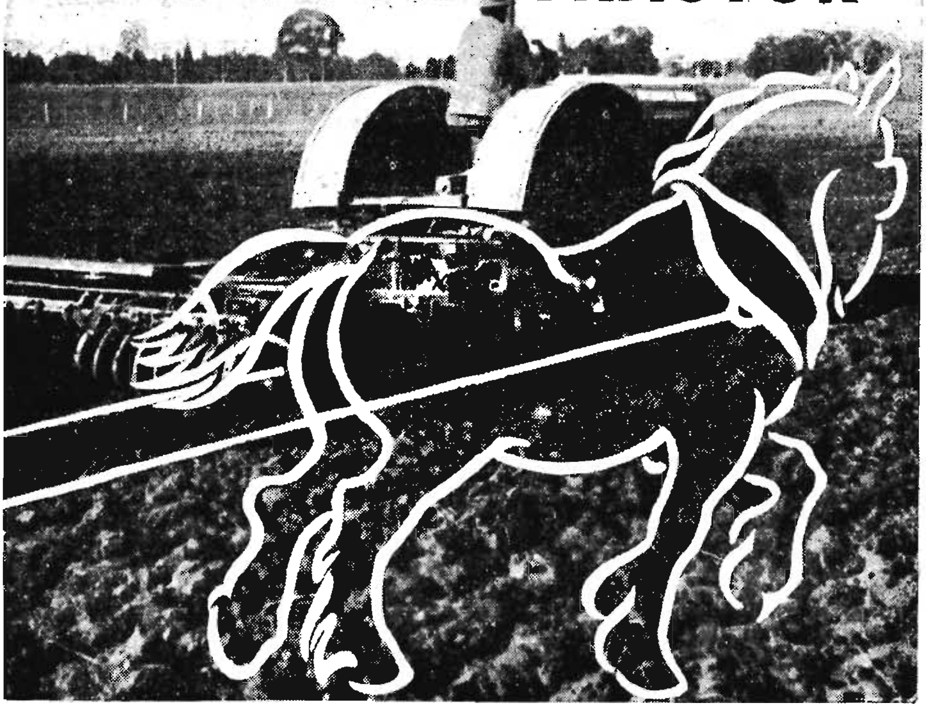

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Further particulars and application forms obtainable from the Agricultural Bank of Tasmania, Macquarie Street (G.P.O. Box 646 C) Hobart; The Agricultural Department, George Street, Launceston, and from District Agricultural Officers stationed at Devonport, Ulverstone, Burnie, Smithton, Scottsdale and Campbell Town.

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This legislation provides assistance to farmers in adjusting their debts. The Act was recently amended, and particulars of the new conditions will be supplied on application to the Farmers' Debt Adjustment Board, c/o The Agricultural Bank of Tasmania, Macquarie Street (G.P.O. Box 606 E), Hobart, or to any District Officer of the Agricultural Department.

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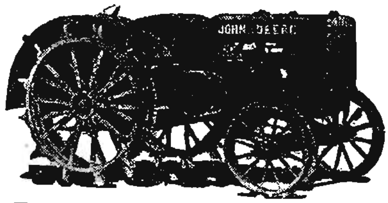

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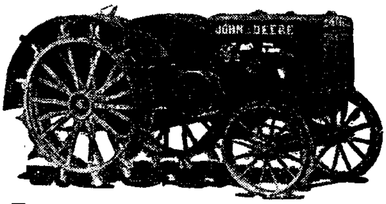

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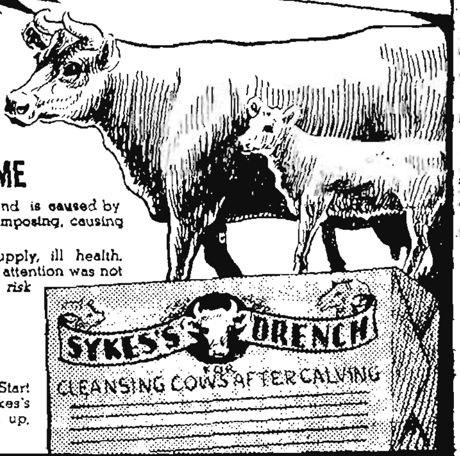

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HINTS ON WOOL-CLASSING

SMALL GRAZIERS' CLIPS

By M. J. P. NEELY

THE small woolgrower frequently experiences difficulty in the classing of his clip, and the suggestions herein contained are intended as a guide to the simplest methods of attaining results which will meet all practical requirements.

Careful preparation is a decided advantage to the grower, for apart from the difficulty which the buyer finds in appraising mixed or badly sorted lots, an attractive presentation of the clip must contribute largely to the creation of a favourable impression in his mind.

The following suggestions will accomplish all that is required of the small sheep farmer.

The sheep-yard should be closed up for three or four weeks prior to shearing to allow it to become covered with grass, or, if it is dry and ungrassed it should be sprinkled with water in order to keep down dust, than which there is nothing more injurious to the appearance of the wool. The sheep should be drafted according to their sex, and also according to their age if there are a sufficient number to justify the latter operation. The adoption of this system will be found greatly to facilitate classing. Frequently the farmer runs two types of sheep, such as Merino and crossbred, and in such cases the two types should be drafted apart and each shorn separately.

The first operation before commencing to shear should be a thorough cleaning out of the shed and bins in order to avoid any foreign matter such as straw, chaff or twine being mixed with the wool. The bins should be branded according to the different classes to be made. The wool table should then be prepared and should be from nine to ten feet long, four to five feet wide, and about three feet high. The rollers should have half-an-inch or so of space between them and be of 1 inch to 1½ inches in diameter; this space allows the locks or second cuts to fall from the fleece through the table on to the floor. Pieces of wood or branches about the size of a broom handle make a very good table. The bottom of the table should be boarded in to keep the locks, etc., together. It is hardly necessary to point out that sufficient space should be provided in which to arrange tables, bins, wool press and baskets.

In case of wet weather it is prudent to have sufficient cover to house the sheep for at least two days' shearing, and the wool shed should be well lighted, preferably from the roof.

In shearing, as much wool as possible should be removed from the sheep without cutting the skin or breaking up the fleece unnecessarily, while it is a matter of importance to reduce the number

of second cuts to a minimum. The reason for the latter precaution will be appreciated when it is remembered that second-cut wool falls through the rollers of the table and is baled with the locks, which do not bring one-third the price of fleece wool, so that it is better to let it remain on the sheep until the next shearing.

Skirting and Rolling the Fleece

As soon as the fleece is off the sheep's back it should be picked up by the britch and drawn in folds towards the operator, and then thrown on the rolling table, the clean or cut side underneath. A lot depends on the throwing out of the fleece, because, if well done, the skirting can be carried out quickly and correctly. If, on the other hand, the fleece is badly thrown it is hard to know where to begin. In skirting, the first thing to do is to cut off the britch wool as deep as necessary. This wool is usually coarser than the rest of the fleece, and when the sheep are pastured on burry country the britch wool picks up and retains a great deal of burr. All burry wool should be taken off unless the bulk of the fleece is similarly affected, in which case only the worst portions should be removed. The britch wool should be placed in a basket or otherwise kept separate from the rest of the fleece, and on no account should it be mixed up with the necks or other skirts. The operator should then work up the sides of the fleece. Generally speaking, the correct amount of skirt to take off is all that which comprises the dirty, straggly, burry and seedy pieces; with some clips it may be advisable to take off a good deep skirt, while in other cases only a narrow margin need be removed. Whatever skirting is done care must be used not to remove wool unnecessarily or to leave pieces on the fleece which should be taken off. Evenness of skirting is a matter of considerable importance.

Skirting of the neck portion of the fleece must be carried out according to the particular needs of the case, which vary according to the class of country on which the sheep have been running. Sheep off good grass country generally have cotted lumps of wool on the neck portion, and in this case the neck wool should be cut straight across. On the other hand, those which have been run on salt-bush or scrubby country are free from cotted wool, but have what is called a "sticky" neck, *i.e.*, the neck wool contains short, broken twigs, etc. In this case the neck must be skirted round lightly and the affected parts taken out in a "V" shape, thus removing the faulty wool without interfering with the shoulder region. Should the back be sandy or mushy it must be removed also. Skirting should be done with the hand moving from the body and not towards it—a pushing, not a pulling movement.

The fleece is now ready for rolling. There are several ways of carrying out this operation, but the following method shows the fleece to good advantage: First, throw over about two-thirds of one side so as to cover the back or weak part. Then throw the same side in a second time, which will expose the whole of the back from the neck to the britch. Next, pull over the other side and throw in the neck. Now commence at the britch and roll towards the shoulder, and when this operation is completed the back will

be folded inside and the best grown side will be exposed. Care must be taken not to stretch the wool unduly. When the fleece is nearly rolled and the neck is reached, draw out a small piece of wool with the right hand, give it two twists, and with the left hand make a small hole in which to put the resulting tassel, which should be put through crosswise.

Should it have been found necessary to remove the back, the sides of the fleece are drawn together before rolling in such a way as to fill up the gap.

Classing

Where the small grazier's and farmer's wool is concerned, it is advisable to limit the number of classes to as few as possible.

In the case of a Merino flock, where the principal difference between the fleeces is one of *condition*, it would only be necessary to make two classes, with a "cast" sort for dingy and discoloured wool, such as the following:—

AA Merino—Consisting of all the good, bright, light fleeces.
A Merino—Consisting of all the heavy-conditioned, dull fleeces.
Fleece—Consisting of all the dingy and discoloured wool.

Belly wool and rams' wool should each be kept separate and branded according to class. Stained and black wools should also be kept separate.

SKIRTINGS.—These are generally divided into first pieces and second pieces, and branded accordingly. The first pieces consist of the bigger and cleaner pieces, and the second of the trimmings and dirty edges taken from the bigger pieces.

LAMBS.—When classing lambs' wool, which does not hang together in the same way as wool from a grown sheep, it is necessary to pick the fleece up between two boards, and the table should be covered with hessian, otherwise the wool will fall between the rollers owing to its shortness. Only one fleece should be picked up at a time, and should not be placed on top of another fleece as this causes extra trouble in classing. If the wool is comparatively free from burrs or seeds the bulk of the long, light wool from the shoulder, back, etc., can be classed as the best lot, whilst the shorter and heavier wool minus the stains will make the second sort. The two classes should be branded first lambs and second lambs respectively.

Cross-Bred Fleeces

Classing of the wool from crossbred flocks is absolutely necessary. At the present time the classing of this wool leaves room for considerable improvement. It is inadvisable that the untrained classer should attempt to make too many sorts. Three sorts, comprising fine, medium and coarse fleeces will be found to meet requirements, and the following brands will suffice:—

AA Crossbred—Consisting of all the fine, light crossbred fleeces.
A Crossbred—Consisting of all the coarse crossbred fleeces.

Any cotted, fatty or discoloured fleeces would be branded crossbred.

Rolling and skirting should be done on practically the same lines as the Merino fleece, the first pieces consisting of the lightest, brightest and bulkiest; second pieces are made up of the remainder, minus the stains, which should be dried in the sun and packed separately.

Lambs should be classed into two sorts—"firsts" and "seconds."

Wool from crossbred lambs is very difficult to class on account of the different qualities, but it will be found worth while to keep the finer wool separate from the coarser.

Classing on the basis of staple length is also desirable in cases where a sufficient number of sheep are run to make such a classification worth while. There is, however, little scope for this procedure where the small grower's clip is involved, as frequently the number of fleeces is insufficient to make practicable the number of extra classes which it necessitates.

In filling the bale the fleeces should be handled carefully, and only two at a time, and placed in layers so that when the bale is opened up on the show floor the fleeces will be as nearly as possible in the same condition as they were after classing. Bales should be of even weights, and the average weight of greasy fleece wool is about 350 lbs. The bales containing pieces and stains can be considerably heavier. It will be found an advantage to keep the bales clean, especially when pressing, by keeping the floor well swept.

Ends of string should be placed in a bag kept for that purpose to avoid being mixed with the next wool.

The bales should be branded legibly and with system. On one end the name of the farm or station should appear, and underneath the number of the bale. On the top of the bale the brands should be in the following order: Owner's initials, name of farm or station, description of the wool in the bale, sex and/or age of the sheep, and lastly, the number of the bale. The bales should be numbered consecutively throughout the clip, regardless of class groups, using fairly blocky figures about four inches in length.

CERTIFICATION OF COCKSFOOT SEED IN TASMANIA

By R. H. BEVIN, Chief Agronomist

TESTS carried out at the Strathroy experimental area over the past four years have established the fact that excellent pasture types of cocksfoot grass are obtainable from Tasmanian old pastures. They are of similar habit, leafiness, vigour and persistence to New Zealand Akaroa cocksfoot.

One of the difficulties with seed from Tasmanian old pastures in the past has been the production of a sample reasonably free from other grass seeds, particularly Yorkshire Fog. This species also in time finds its way into newly-sown areas, unless these are sown in rows and intercultivated. Analysis shows that 1 per cent. by weight of Yorkshire Fog in cocksfoot is equivalent to approximately 10,000 seeds per pound; the importance, therefore, of both a clean crop and of efficient seed cleaning machinery will be appreciated. Now that modern seed dressing machinery is available in the State impurities can be reduced to a figure comparable with the best imported New Zealand lines. The Department of Agriculture is therefore introducing a certification scheme whereby superior strains of cocksfoot seed can be produced locally.

In the statement of conditions given below it will be noticed that the maximum allowable content of other crop seeds is 2 per cent. The seeds usually found besides Yorkshire Fog are Kentucky blue grass and ryegrass. If these plants are present to any extent in the crop it should be harvested as late as possible. The majority of these plants will then have shed their seed and the production of a clean sample is facilitated.

The standards for purity and bushel weight are lower than those for certified ryegrass. This is due largely to the presence in the cocksfoot seed-head of a large number of empty glumes which cannot be removed without loss of good seed. These empty glumes make up the bulk of the inert matter which is always present in samples of cocksfoot seed.

Where small areas are being sown down, the grower should consider sowing in rows. By thus concentrating on seed production heavier yields of seed per acre and a cleaner sample will be obtained. A saving in the initial cost of seed sown will also be effected. Rows should be at least 21 inches apart and sown at the rate of 8 to 10 lbs. per acre with 1 cwt. 2:1 nitro super.

Larger areas can be kept in good order by careful grazing management. Stock should be removed sufficiently early after the cocksfoot commences active growth in the spring, to allow of heavy seed-head development, and should be kept off till the seed is harvested. The early autumn is another critical time for cocksfoot. Stock should be removed at that time and the cocksfoot

allowed to grow freely to lay down reserves for the winter. Grazing in late autumn is beneficial as it suppresses other growth, particularly ryegrass. Grazing areas should be sown broadcast at the rate of 15 to 20 lbs. per acre, preferably in February on a summer fallow. A light seeding of subterranean clover (2 lbs.) on light soils, or white clover ½ lb.) on heavier soils with 1 cwt. superphosphate should be included where fertility is inclined to be low.

A statement of the certification scheme, which is similar to that already in operation for ryegrass, follows.

Certification of Cocksfoot Grass

The Tasmanian Department of Agriculture will certify seed harvested from approved stands of cocksfoot grass *(Dactylis glomerata)* on registered areas.

The area from which the seed is produced must be registered and the crop must pass inspection. After threshing the seed will be sealed and tested. The seed must reach a certain standard of germination. Machine dressing by an approved seed-cleaning plant must be carried out and the dressed seed must be of a certain standard of purity. A certificate will then be supplied from which the origin and test figures of the seed can be obtained. The seed will finally be tagged and sealed.

The Department reserves the right to refuse registration of any area and the certification of any seed.

AREAS ELIGIBLE FOR REGISTRATION

Strain.—The following types of cocksfoot grass will be eligible for registration:—

(1) Areas of old pasture, the plants of which are of approved type and have been sown for not less than ten (10) years.

(2) Areas sown with New Zealand Certified Mother Seed Cocksfoot but with no other seed.

(3) Areas sown with an approved strain of pedigree cocksfoot seed but with no other cocksfoot seed.

Minimum Area.—The minimum total area eligible for registration is three acres. Where more than one area or paddock is submitted it is necessary to register each one separately.

Isolation.—The area to be registered must be at least 5 chains from any crop of cocksfoot of different strain.

Noxious Weeds.—Any area infested with noxious weeds may be refused registration.

REQUIREMENTS FOR REGISTRATION

Inspection.—Areas submitted for registration will be subject to inspection by an officer of the Department of Agriculture. New areas will be inspected at the time of sowing; old areas will be inspected as soon as possible after the sowing season.

Notification by Grower.—New Areas: Growers intending to sow new areas must notify the Department of Agriculture at least seven days before sowing. An officer will then attend to break the seals and collect certificates, to sample the seed and to record the location.

Old Areas: Growers intending to register old pastures should notify the Department of Agriculture by the 30th June for inclusion in that year's registrations. An officer will attend to inspect the pasture, to take samples and to record the location.

CONDITIONS GOVERNING CERTIFICATION

Seed from registered areas is eligible for certification only if the crop and seed has been subject to inspection at various stages. These inspec-

tions will be arranged after notification has been received from the grower and from the person or firm carrying out machine dressing.

Inspections.—(1) Registered areas from which seed is to be harvested for certification will be inspected at the flowering or seed-head stage by an officer of the Department of Agriculture.

(2) The threshing of the seed will be supervised by an officer of the Department. He will weigh, brand and temporarily seal the bags and take a sample for germination test.

Germination.—The germination standard for cocksfoot grass is 75%. If this figure is not reached the seed will be uncertifiable. If the standard is reached, machine dressing should be arranged with an approved firm.

(3) The machine dressing of the seed will be supervised by an officer of the Department of Agriculture. He will break the temporary seals and take samples of the dressed seed for testing. The dressed seed will be placed in new bags and weighed.

Dressed Seed Standards.—Purity: The minimum purity for cocksfoot grass is 75%.

Other crop seeds must not exceed 2%, and there must be no noxious weeds.

Bushel Weight: The bushel weight must be 14 lbs.

If these standards are reached the officer will insert a certificate and tag and seal each bag. Seed not reaching the standard may be re-cleaned until up to standard.

NOTIFICATIONS

To enable inspections to be arranged certain notifications are required.

(1) The grower of a registered area is required to notify the Department of Agriculture not later than 30th October in any year of his intention to harvest seed for certification.

(2) The grower should notify the Department, as early as possible, of the date he intends to thresh the seed.

(3) Notice of intention to machine dress seed for certification is required from the person or firm undertaking it.

DECLARATIONS

(1) In the event of an officer not being available for the inspection of the whole of the sowing of a new area, the grower will be required to sign a declaration as to the seed sown on the area.

(2) After threshing, the grower is required to sign a declaration that all the seed submitted for certification is the produce of the registered area only, and to state the quantity and destination of the seed for machine dressing.

Further information regarding cocksfoot certification may be obtained from the district offices of the Department of Agriculture, where applications for registration may be lodged.

TOBACCO CULTURE

SEASONAL NOTES (July-December)

By D. H. MALCOLM, Senior Agricultural Officer

THE present month will see the completion of the sowing of tobacco seed beds in all parts of the Island, and thus commences what is expected to be one of the most important seasons up to the present, in the history of tobacco-growing in Tasmania.

Present indications are that approximately 160 acres will be planted out, and this is the second largest area yet recorded, being eclipsed only in 1931-32, when 200 acres were grown. Last season the crop was harvested from an area of about 95 acres.

The large increase in the area planted this season is gratifying, but the feature of greatest importance is that this year marks the commencement of growing on a commercial scale in the Scottsdale district, where trials have indicated that certain soil types are suitable for tobacco.

In an attempt to foster the development of the industry the Government has approved of a group scheme for growing in new areas, and the first "group" has been established in the Scottsdale district. It is composed of seven growers who will collectively plant out 27 acres. Under this scheme a depot has been established at Scottsdale, where the required number of plants will be raised and distributed to the growers. After growing the crop the farmers will deliver the ripe leaf to the depot, where it will be cured and later graded and offered for sale on account of the growers. A foreman has been appointed to take charge of operations at the depot, and he will also be available to instruct farmers in the various cultural operations in the growing of the crop.

It is expected that the charges for seedling plants and the curing, grading and marketing of the leaf will amount to between 10d. and 1/- per lb. of leaf sold, and will be a first charge against money received from the sale of the crop.

In all cases a careful inspection of the soil type to be used is made before a farmer is admitted to a group, and members are required to sign an agreement to work under the supervision of an officer of the Department of Agriculture.

Under this scheme newcomers to the industry will be relieved of the risk of failure through inexperience of nursery work or curing and grading operations. It will also be possible to prevent the growing of tobacco on unsuitable soil types by refusing admission to a group, of any person not approved by the Department of Agriculture. Under the depot system, also, the grading of the leaf will be standardised as far as possible and should result in more attractive lines being offered to the buyers.

The "group scheme" is a new departure in Australia, and it is hoped that the coming season will be a favourable one and that the first season's operations in this new area will be satisfactory to all concerned.

At Edith Creek a number of farmers intend putting out small areas of tobacco, but the work here is still in the experimental stage, and it is felt that extensive development is at present not justified. The experimental area will this year be increased in size to permit investigation of the factors necessary to effect an improvement in the smoking quality of the leaf.

Location trials will also be carried out at Lilydale and other parts of the North-East where suitable soil types are believed to exist.

Seed-Bed Work

Since the population of a seed-bed averages about 500 plants per square yard it is obvious that a fertile soil and adequate fertiliser are essential if good stocky transplants are to be produced.

Soil in beds in which plants were grown last season will be found to be partially exhausted and should be replaced to a depth of 2 to 3 inches with good, rich loam that has been well screened to remove roots, etc.

This soil may be sterilised by baking or steaming before being placed in the beds, or it may be treated with a quarter per cent. solution of formalin watered into the soil after it has been placed in the beds. Sufficient of the solution is watered into the soil to moisten it thoroughly, after which it is covered with bags and left for 48 hours. It is desirable at the same time to spray the walls and covers of the seed-beds with formalin solution in order to kill the spores of fungoid diseases that may have lodged there.

Seed-beds should not be sown within a week of sterilising with formalin.

If constructed with calico, last year's seed-bed covers will also need replacing. A cheap grade of unbleached calico will be found satisfactory, and this should be painted with raw linseed oil to prevent the entry to the beds of rain water. These covers quickly deteriorate and become semi-opaque through the growth of mildew. Several workers have been investigating this problem, and, writing in the West Australian Journal of Agriculture, Sharp reports success with the following mixture:—

12 lbs. 125°/130° Paraffin Wax.
1 lb. Clear Petroleum Jelly.
1 pt. Boiled Linseed Oil.
2 galls. Mineral Turpentine.

The mixture is kept fluid by heating and the calico drawn slowly through it.

This has not yet been tried under Tasmanian conditions, but is reported to give better results than the usual linseed oil treatment in Western Australia.

The following fertiliser is recommended as a satisfactory dressing for seed-bed work, *viz.*, 3 lbs. superphosphate, 1 lb. nitrate of

soda and 1 lb. sulphate of potash, to each 150 square feet of seed-bed area. The fertiliser should be broadcast over the surface of the bed and thoroughly worked into the top layer of soil by raking.

Unduly heavy dressings of superphosphate should be avoided for a high concentration of this compound in the top inch or so of soil may seriously affect the germination of the seed. Instances of faulty germination where quantities up to 15 lbs. of super per 150 sq. ft. have been used have undoubtedly been due to this cause.

In calculating fertiliser dressing for small areas the following table may be used:—

Cwts. per acre		Ozs. per sq. yd.
1	equal to	$\frac{3}{8}$
2	,,	$\frac{3}{4}$
4	,,	$1\frac{1}{2}$
6	,,	$2\frac{1}{4}$
8	,,	3
10	,,	$3\frac{3}{4}$

Seeding

Hickory Pryor still continues to be the most popular variety, and is almost universally grown. The Department has, however, been testing several new varieties of high reputation in the U.S.A., and of these Gold Dollar appears to be very promising (see report in this issue). A small quantity of Gold Dollar seed is on hand and may be obtained from the Department of Agriculture, Hobart, at 2/6 per oz. Ample supplies of selected Hickory Pryor seed guaranteed free from disease are also available at the same price.

Opinions differ considerably as to the quantity of seed to be used, but with good viable seed a heaped teaspoonful per 150 sq. ft. will be found ample.

In order to get an even distribution throughout the bed it is necessary to mix the seed with a quantity of fine sand or wood ashes. Superphosphate should not be used owing to its caustic action.

After the seed is broadcast it is lightly pressed into the soil with a board.

Last season considerable trouble was experienced with ants which carried off the seed. In some cases the loss of seed was so severe that the bed had to be resown. This trouble may be obviated by covering the beds after sowing with $\frac{1}{4}$in. of fine river sand. Poison baits may also be used if desired, but should not be necessary if sand is available. Baits are prepared by mixing 4 lbs. sugar and 1 oz. borax in half-a-gallon of water and boiling for 15 minutes. When cool the mixture is placed in shallow tins round the bed. About six tins to a bed are sufficient, and in a week the ants will be eradicated.

Various species of leaf-hoppers may also cause serious trouble in the seed-beds by eating off the tiny plants as the seeds germinate. Effective control may be obtained by spraying at weekly intervals with standard strength nicotine sulphate (1 oz. to 4 galls. of water) or neutralised lime sulphur solution at a strength of 1 in 80.

Occasional sprayings with Cheshunt Compound will also assist in preventing outbreaks of damping-off, but where well sterilised soil has been used this should not be necessary.

When the plants are 1½in. to 2in. high the beds should be thinned until the plants are about 2in. apart. In order to get an even stand the plants removed in thinning should be pricked out into the bare spaces in the beds.

Over-watering should at all times be avoided. During the germination period the soil must not be allowed to develop a dry crust, but once the plants are up the beds should not receive more water than is required to sustain growth. Over-watering and over-heating of seed-beds are two faults frequently observed, and if they do not cause an outbreak of damping-off will almost certainly result in the production of weak, spindly plants that will transplant badly.

Sufficient ventilation, especially towards the end of the growing period, together with a somewhat sparing application of water, will produce plants that will transplant to the field with very few losses.

The process of "hardening-off" should be commenced about three weeks before transplanting is expected to start, and consists of gradually checking their growth and tempering the plants to open-air conditions. At the same time, however, care must be taken to avoid stunt injury, for if the stems become tough and woody rapid growth cannot be expected in the field.

By the time hardening-off has been under way for a week or so it should be possible to remove the seed-bed covers without the plants scalding or wilting, but care must be taken in windy weather to see that the soil does not dry out to such an extent as to damage the plants. Where the soil temperature is under control this should gradually be reduced to that of the fields where the crop will be grown.

Transplanting

The results of the fertiliser trials at Bushy Park for the 1936-37 season are published elsewhere in this issue, and indicate that in the Derwent Valley a dressing of 6 cwts. superphosphate and 2 cwts. sulphate of potash will give high yields combined with satisfactory quality.

It is considered that this fertiliser would also be suitable for soils in the North-East and at Westbury. On the poor sands of the Edith Creek area a dressing of 1,000 lbs. per acre of a 4-15-12 mixture is suggested until such time as further experimental work has been conducted at that locality.

The usual practice in Tasmania is to broadcast the fertiliser, and this should be done a week or so before transplanting and just prior to the final cultivation, which will ensure the incorporation of the fertiliser with the surface soil.

The necessity for thorough cultivation of the soil is generally appreciated and need not be referred to here at any length. It should be mentioned, however, that where the "Masters" hand

planter is to be used it is essential that the surface of the soil be loose. If the soil is at all crusty the machine will not function satisfactorily.

FIG. I

MISSES DUE TO CUT-WORM ATTACK

This field was not baited.

FIG. II

ALMOST 100% STRIKE

This field was baited before planting

In old fields cut-worms will usually cause some loss of plants, and may reduce the stand by as much as 30 to 40 per cent. Each year complaints are voiced regarding the trouble caused by this pest and it is difficult to understand why baiting the fields a day or so before transplanting has not become standard practice.

To prepare the baits mix dry 50 lbs. bran and 1 lb. lead arsenate or Paris green. When thoroughly mixed, gradually add water until the whole mass is damp. The bran should not be sufficiently moist to adhere, but should remain crumbly. From 6 to 9 gallons of water will be required to prepare the mixture, and the addition of a little sugar or molasses adds to its effectiveness.

The bran is broadcast over the field some two or three days before transplanting at the rate of about 20 lbs. of the *dry* material per acre. Baits should always be applied at sundown, as once the bran is dry it becomes unattractive to the grubs.

The distance at which the plants are set apart is important and will vary according to district. On the whole, however, it will be found that 4ft. spacing greatly facilitates intercultivation. On heavy soils the plants should be from 20in. to 24in. apart in the rows, while on the poorer soils such as those at Edith Creek 27in. is a satisfactory distance.

A wise precaution after transplanting is to mix 20 lbs. pollard with 1 lb. arsenate of lead and apply to the plant as a dust from a jam tin with holes in the bottom. This will ensure the poisoning of any cut-worms that may have escaped the baits. For convenience in working the tins may be fastened to a stick about two feet long.

This dust will also be found effective in dealing with bud-worm attacks later in the season.

Cultivation

During the first eight to ten weeks the plants are in the ground, constant and thorough cultivation is essential in order to promote rapid growth. Immediately after planting the scarifier should be run through the field in order to loosen the ground where it has been trampled by the planting teams, and once the plants have struck, the flat hoe should be brought into operation.

At no time should the ground be allowed to become crusty, nor should weeds be permitted to rob the young tobacco plants of nourishment. It will probably be found that cultivation is required every seven to ten days.

During the later stages of cultivation the width of the scarifier should be reduced in order to prevent damage to the root system of the plants, which by this time should be well out in the rows. By the time the plants are ten weeks old it will probably be found that further cultivation is rendered inadvisable owing to the wide spreading of the roots.

[To be continued]

VIRUS DISEASE IN STRAWBERRIES

By T. D. RAPHAEL, Horticulturist

ALTHOUGH the fact has not generally been recognised by berry fruit growers, practically all strawberry varieties in Tasmania have, during the past ten years, been gradually deteriorating through the increase and spread of a type of virus disease. Whilst many growers engaged in the production of potatoes, tobacco and other crops are already familiar with this disorder, it is only in comparatively recent times that berry fruits have become involved, and for this reason a fairly full description follows.

Cause and Spread

Insofar as present investigations have revealed, virus diseases are caused by ultra-microscopic organisms generally spread by some particular insect or insects which, in the course of feeding, carry the infection from diseased to healthy plants, and are known collectively as "vectors." Where vegetative methods of reproduction are used the disease may increase even more rapidly by other means, for recently affected plants, though weakened to some extent in the early stages, have still sufficient vigour to produce quantities of affected runners which will, unless discarded, increase the proportion of diseased specimens throughout new and subsequent plantings.

Symptoms

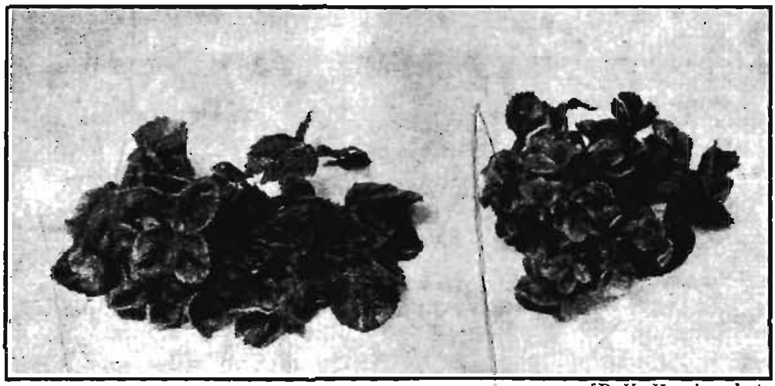
Affected plants at first show only slight weakening from the disease, but in the course of the year often become so poor that their future cropping capacity is reduced to uneconomic or even negligible quantities. Certain varieties appear to be more resistant than others, Ettersburg being an example. It is perhaps owing to this resistance that the variety is so popular and has gained such a reputation for vigour and productiveness, whilst the susceptible Royal Sovereign has practically passed out of cultivation. Unfortunately, however, Ettersburg is far from immune, and each year the proportion of virus-affected plants is increasing. At the present time very few really sound stocks can be found.

Plants exhibiting the following symptoms should be regarded with suspicion:—Infertility and aborted blossoms; crinkled, crimped, distorted or blotched crown leaves; lack of colour and size in the leaves; lack of pigmentation in the leaf stems; and lastly, leaves with pale green or yellow edges. It is from this last striking and typical characteristic that the virus disease has derived the name "Yellow Edge." In America a similar degenerative trouble has been extensively investigated, and is popularly known as "Yellows," or more accurately perhaps, as "Xanthosis."

Culling

It is realised, of course, that many of the indications mentioned in the foregoing section might be attributed to some local injury

or soil trouble, whilst the presence of red spider, aphis and jassids is known to cause somewhat similar leaf crinkling and discolouration. Many growers are, unfortunately, all too ready to accept explanations of this nature rather than remove the suspected specimens, and thus cause their areas to look patchy. Another point to be borne in mind is that the spread of virus disease is directly associated with the presence of certain insects, and therefore such plants come automatically under suspicion. In order to provide against leaving any diseased plants in the area, it is advisable, when any doubt arises in culling, to destroy all that are suspected. The very fact that a doubt exists should be sufficient grounds for condemnation, especially where stock plants are being dealt with.



[R. V. Harris, photo

FIG. I

VIRUS AFFECTED PLANTS TAKEN FROM ADJACENT BEDS OF ROYAL SOVEREIGN AND TARDIVE DE LEOPOLD IN MAY

Note that whilst the old leaves present appear to be normal, the newly formed ones are small, abnormally crinkled and distorted.

Although a certain amount of culling may be carried out at almost any season of the year, once the grower has become familiar with the virus, autumn (April-June) is probably the most satisfactory period for this work in Tasmania. At this season the heat and drought of the summer, following closely upon the crop, have reduced the vitality of the plant to its lowest ebb. With the first rains the usual fresh burst of autumn leaf growth (the health and vigour of which is so important to the succeeding year's crop) commences, and it is these leaves which provide the most satisfactory basis for virus identification.

It is realised that practical demonstration is more useful than written description, and the Department will willingly undertake to arrange a visit to the property of any interested grower who cares to make application.

Control Measures

Up to the present the only method of control suggested has been the intensive culling of established beds. This is the first step, and an essential one, and if the operation is thoroughly carried out and good beds of stock plants are built up for future use, little further difficulty will be experienced.

[R. V. Harris, photo

FIG. II

FOUR TYPICAL "YELLOW EDGE" VIRUS AND TWO NORMAL LEAVES OF ROYAL SOVEREIGN SELECTED FROM NEIGHBOURING PLANTS IN AUTUMN

Briefly, the following points should be observed in the formation of stock beds:—

Runners should only be taken from proved plants of outstanding vigour and productivity. Very large stocks can rapidly be built up from a few plants, for it has been shown beyond doubt that by the second year, third, fourth and later runners will produce plants equally large and vigorous to those originating from first and second runners.

Bearing the above points in mind, special isolated "runner beds" should be formed, the chosen plants being widely spaced so that runners cannot interlace, and that each plant can produce the maximum number. All plants must be deblossomed to encourage early development, and doubtful specimens removed immediately they are noticed. Nicotine sulphate should be used freely until insect pests are eliminated. Strawberry aphis is known to be the most dangerous vector, but certain native jassids and other species may, in the absence of detailed information, quite possibly be of equal importance.

Recently the Department imported virus-free plants of Royal Sovereign, and after acclimatisation several small isolated nucleus beds were established. It is hoped to extend this procedure to other varieties in the near future and thus make possible the distribution of certified plants at a later date. In the meantime, individual growers can best serve their own interests by the inauguration and building up of small stock beds of their own along the lines indi-

cated; the necessity for this cannot be stressed too strongly if Tasmania is to maintain its present Australian reputation for strawberries.

REFERENCES:

[1] Harris, R. V.: The Strawberry Yellow Edge Disease—Jour. of Pom. and Horticulture, Sci., 1933, Vol. II, 56-76.

[2] Massee, A. M.: On the Transmission of the Strawberry Virus "Yellow Edge" Disease by the Strawberry Aphis, together with notes on the Strawberry Tarsonemia Mite.

[3] Plakidas, A. G.: Strawberry Xanthosis (Yellow), A New Insect Borne Disease—Jour. of Agric. Res., 1927, 36, 1057-90.

[4] Raphael, T. D.: Strawberry Varieties, Tasmanian Journal of Agriculture, 1934, Vol. V, 121-123.

[5] W. S. Rogers and J. T. Edgar: Annual Report, East Malling Research Station, 1934 and 1935.

TOXÆMIA OF PREGNANCY

(Twin Disease in Sheep)

The attention of sheepowners is drawn to the possibility of Twin Disease making its appearance in their flocks at this season. Conditions would appear to be conducive to the development of the disease, and in view of the loss which is likely to be occasioned by it the adoption of the appropriate preventive measures, where they appear to be warranted, is advised.

Up to the present no satisfactory line of medicinal treatment has been discovered, and the only effective methods of prevention are those conected with flock management. The measures advocated are—

1. Not to allow sheep to become poor or short of feed during the last months of pregnancy.
2. Provide a bonemeal lick throughout the year.
3. When the disease is likely to occur, place sheep on good green feed such as oats for two or three hours a day.
4. Enforce regular and gentle daily exercise of animals. This is an important safeguard.

Animal Health Service

ONION ROTS

By J. O. HENRICK, Plant Pathologist

ALTHOUGH the onion crop is not important commercially in Tasmania, a considerable number of people grow their own requirements, and it would appear that the crop has a place in every kitchen garden.

During the last two seasons many diseased specimens have come to hand, with requests for information regarding their condition and advice as to control. Two kinds of rot have been particularly prevalent, namely, Storage Rot and White Rot.

STORAGE ROT

This is also known as Neck Rot, Grey Mould and Dry Rot.

Symptoms

The popular names fairly accurately describe the disease, which is generally discovered by the grower after the bulbs have been in storage for some time. Cases have, however, occurred in which the crop has been attacked while in the ground, the bulbs having been left for some time after maturity instead of being lifted at once.

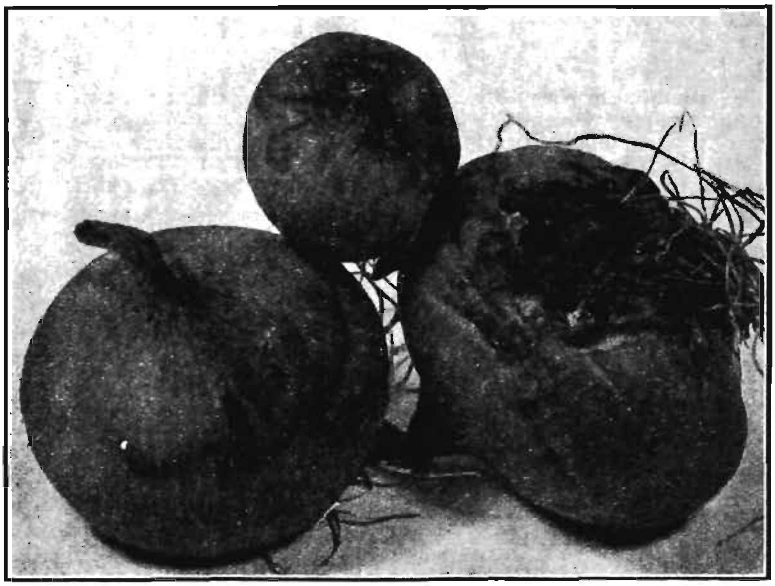


FIG. I
EARLY STAGES OF STORAGE ROT
Note the soundness of the roots

In the early stages the decaying tissues have a water-soaked appearance (see Fig. I, left and centre specimens). These water-soaked areas dry out rapidly and the bulb finally becomes a dried-up "mummy" (Fig. II) with numerous sclerotia (hard, dark bodies) about one-sixteenth of an inch to an eighth of an inch in length, and studded over it. There is no offensive odour during the decay; in fact, the characteristic onion odour is intensified.

Causal Organism

The fungus causing the trouble in all the specimens which have been examined is known as *Botrytis alii* (Munn). Abundant growth of grey weft and production of conidia (seeds of the fungus) have been observed upon the decaying tissue, and extensive sclerotia formation has been seen on dead and dying tissue (see Fig. I).

Infection

The neck tissues are the commonest seat of infection, especially when the neck is thick and succulent. The attack may also take place at the base and sides (see Fig. I, right-hand specimen), entry usually being gained through wounds. The spores (seeds) are present at harvest time, and are derived from decaying and dead infected material. They are carried by wind, rain, tools, etc., to the bulbs. If wet conditions prevail at this time, initial infection takes place, and the disease develops after the bulbs are lifted and placed in storage.

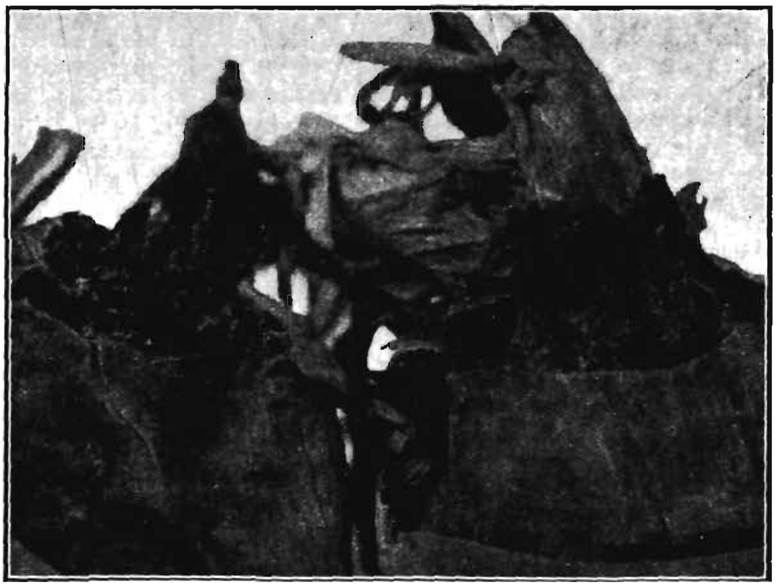


FIG. II

"MUMMY" STAGE OF STORAGE ROT

Scales cut away to show clusters of sclerotia at the neck

Control

Success in control will be attained if the following suggestions are adopted:—

1. Keep the crop growing so that the bulbs will mature when the weather is warm and dry.
2. Dry the bulbs as rapidly as possible and immediately after harvesting. Separate out all the thick-necked onions and give them special attention in drying.
3. Do not store the onions until they are properly dried.
4. Store under dry, well ventilated and cool conditions.
5. Clean up all debris and burn it.

In Tasmania the disease occurs with as much severity on the brown onion as on the white.

WHITE ROT

This is a disease of the growing crop, and should not be confused with Storage Rot. Plants are attacked in the beds from the seedling stage onwards, most of the trouble being experienced in this State during the cool part of the spring.

Symptoms

Infected plants may be scattered throughout the beds and are readily picked out by the wilted and yellow appearance of the tops, which later collapse. On grasping such plants they pull out of the ground readily and the roots are found to be rotted. A whitish, felt-like material is seen to cover the base of the bulb, which is commencing to rot. The wilted appearance of the tops is caused by the destruction of the roots and of the scales. If the disease is well advanced numerous dark sclerotia of pin-point size will be seen in the tissue and on the scales of the bulb.

Causal Organism

The parasitic organism which causes the trouble is known as *Sclerotium cepivorum* (Berk), and it lives several years in the soil. Sclerotia from diseased onion refuse in the soil germinate and the mycelium (body of the fungus) spreads through the bed, enters the roots of the onion plant, rapidly invades the tissues and soon produces a new crop of sclerotia.

Control

No satisfactory measures for control have been devised for large areas. A long rotation is not effective. In France, where infected land has been given over to crops such as garlic, onions, leeks and eschallots for six years and then again planted with onions, the disease has immediately appeared.

In kitchen gardens the soil may be sterilized by disinfection with formalin, which is carried out as follows:—Make up a solu-

tion by adding one part (by measure) of commercial formalin to 59 parts of water; dig over the area to be treated, then soak the tools and wash the boots in some of the solution. Using a watering can, water the area with the solution, using 1 to 1½ gallons per square foot. Cover the area with bags for 48 hours, then remove the bags and fork the land over once or twice during the next three days. Do not plant for at least ten days after the covering of bags has been removed.

REFERENCES:

J. C. Walker: Journal Agric. Research, 33 (10), 893.

J. C. Walker: Phytopath, 14:26.

C. Chupp: Manual of Vegetable Garden Diseases.

NICOTINE SULPHATE AND BLUESTONE DRENCH

A WARNING

In view of the increased popularity of this drench for the internal parasites of sheep, it is desired to point out that particular care must be taken, in using drenching funnels ad syringes, not to injure or pierce the mucous membrane of the mouth. If this is done and an irritating substance like nicotine sulphate gets into the tissues it will cause a severe cellulitis or inflammation of the connective tissues, which results in severe swelling, which may be followed by gangrene and sloughing of the tissues, or even lead to the death of the animal.

The writer saw a number of such cases on a recent visit to the Glenfield Research Institute, New South Wales.

It is quite easy to damage the tissues with the nozzles of drenching guns, and some measure of protection would be afforded by placing a length of rubber tubing over the nozzle so that it projects over the end of it.

Chief Veterinary Officer

ABORTION-FREE HERDS

As at 30th June, 1937

THE following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Owner	Address	No. of Cows
Reynolds, H. B.	Relbia	19
Archer, C. A.	Calder	8
Foster, R. J. L.	Evandale	76
Jessup, H. J.	Scottsdale	48
Coombe, B. R., and Bedlington, W. C.	Forth	56
Mervyn Bræ Stud	Scottsdale	35
Ashley Home for Boys	Deloraine	31
Steel, L. J.	Falmouth	176
Lansdell, Mrs. E.	Bracknell	24
Heazlewood, H. R.	Whitemore	11
Hiscutt, J.	Howth	62
Gladman Bros.	Carrick	26
Fisher, J. E.	Oatlands	19
Beveridge, H. C., and Sons	Latrobe	39
Ollington, W. L.	Forest	23
Spinks, K.	Lileah	5
Griffin, J. R.	Gunn's Plains	28
Relbia Farm and Dairy Co.	Relbia	84
Fergusson, F. C.	Penna	50
Lambert, J. D.	Latrobe	28
Edwards, J. C.	Derby	34
Heazlewood, T. A.	Hagley	15
Bovill, H. Y.	Devonport	48
Green, S. G.	Penquite	45
Geale, Mrs. G.	Jetsonville	31
Reed, G. E.	Berriedale	33
Scott, H. Barclay	Whitemore	55
Roebuck, N.	Native Plains	60
Johnson, J. F. and G. M. L	St. Helens	10
Briggs, A. H.	Scottsdale	32
Briggs, C. H.	Scottsdale	38
Stancombe, A. J.	Western Jnc.	40
Perkins, V.	Latrobe	72
Wells, H. Lucadou	Carrick	53
Thompson, J. H. (Estate)	Flinders Island	116
Hall, E. G.	Alanvale	97
Stuart, L. A.	Whitemore	57
Heazlewood, R. K.	Whitemore	34
Sadler, B. T.	East Devonport	140
Ranson, F. W.	Derby	51
Priestley, T. R.	North Scottsdale	53
Robotham, H. V.	Ridgley	27
Badcock, Mrs. F. R., and Sons	Whitemore	19
Badcock, B. M.	Whitemore	23
Hingston, S. J.	Whitemore	18
Cowie, A. E.	Flowery Gully	76
Beardwood, T. J.	Prospect	3
Gardner, H. R., and Sons	Relbia	189
Loosmore, T. C.	Scottsdale	25
Salier, H. G.	Scottsdale	14
Taylor, M. K.	Brighton	37
Jessup, A. V.	Springfield	22
Smith, E. J.	Springfield	35
Badcock, L. A.	Whitemore	18
Haines, H. C.	Ringarooma	39
Williams, J. H.	Springfield	18

Owner	Address	No. of Cows
Hookway, H. H.	Scottsdale	43
Wells, J. L.	Mt. Hicks	17
Treloggen, J. W., and Sons	St. Helens	137
Treloggen, D.	St. Helens	52
Gowans, W. C.	Glengarry	13
Clifford, F. G.	Kellevie	28
Meredith, D. O.	Plenty	39
Watchorn, J. B.	Kingston	18
Dransfield, W.	Copping	12
Bryan, J. R.	Copping	23
Smith, W. J.	Copping	20
Morse, R. V.	Yolla	32
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Robinson, H. A.	New River	25
Ranson, J. S.	Branxholm	60
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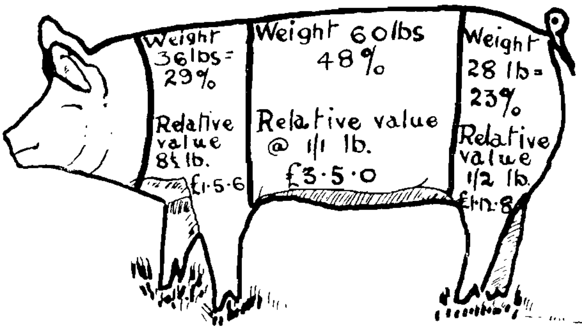

WEIGHT AND RELATIVE VALUE OF FORE END, MIDDLE AND GAMMON, RESPECTIVELY, OF A BACON PIG

ANSWERS TO ENQUIRIES

HYDATID CYSTS IN SHEEP

From W.J.S.: On dressing a sheep recently I found a number of watery bladders on the liver and lungs. Could you please tell me what these are, and how they can be cured or prevented?

Answer: These bladders are commonly called Hydatid Cysts and are very common in sheep and cattle, and also in man.

They are the cystic stage of a very small tape-worm which is found in the dog. The eggs are passed out of the dog onto the pasture or into water. They are eaten by sheep and cattle, the embryos hatch out and pass into the intestines, and finally develop into bladders or cysts in the various organs. Dogs become reinfected with tape-worms on consuming the raw offal containing these cysts.

There is no effective treatment for cysts in sheep or cattle, therefore consideration should be given to the prevention of their occurrence. All dogs should be kept away from abattoirs and should not be allowed to consume raw offal. Dogs on sheep farms should be regularly treated for tape-worms.

Animal Health Service

GROWTH ON THE GUMS

J.W. writes: I have a horse with a round, fleshy growth on the gum at the base of the teeth. It appears to be increasing in size rather rapidly. Could you please inform me what this is, and how it should be treated?

Answer: This is a growth known as an "Epulis." They are often malignant in character. Early and complete removal by a qualified veterinarian should be undertaken, and, to avoid as far as possible the accumulation of food which would act as an irritant on the resulting wound, the animal should be fed on sloppy food.

The same condition sometimes occurs in cattle, and as there is a liability of recurrence after removal, the slaughter of these animals in the early stages is recommended if they are in good condition.

Animal Health Service

WHEAT FOR SPRING SOWING

Enquiry from H.C.McB.: I have been told that there are several kinds of spring wheat that can be grown in Tasmania. Can you tell me what are the best sorts, and where I can get seed? Also, what is the difference between spring and winter wheat?

Answer: It is understood that by spring wheat you are referring to a type suitable for spring sowing. For this purpose quick growing and early maturing types are required as these are best able to give a normal yield when allowed only a short season in which to pass through the growth period which precedes heading. Up to the present wheats of this type have not been grown to any extent in Tasmania, but several imported varieties and new crossbreds are under trial at the Cressy Departmental Farm, and it is hoped that one or more of these will prove suitable for spring sowing.

Until more information is available, the variety recommended where sowing has had to be delayed beyond the end of May, is Major. This is a mid-season variety which has often given good yields from spring planting. It is advisable to increase the rate of seeding by 15 to 20 lbs. per acre for this purpose.

A true spring wheat is one which produces ears in the same season when planted in spring, and practically all Australian varieties are of this class. Winter wheats when spring sown do not produce ears until the following season.

Agronomy Division

BEST TYPE OF PIG FOR EXPORT

Enquiry from N.J.: There has been some talk of exporting pigs from the Coast this year, and I would like to know what is the best breed of pig to keep for export?

Answer: So far as export conditions are concerned it is not so much a question of breed as a question of type. The export market requires a pig which is light in the head, neck and shoulders, long in the back with deep, well-fleshed sides; the back should be broad and show clearly where the back leaves off and the sides begin. The hams should be well developed but free from bulging or wrinkles. The skin should be mellow, soft and white, without pigmentation and free from black or red bristles. The bone should be fine and compact. The belly meat should be thick and well streaked with lean, and should be free from "seedy cut." Preference is given to white pigs.

This type of carcase will meet the requirements of either the pork or bacon market provided that it is within the right weight range.

This type can best be produced from crossing a selected Large White boar on a sow of any of the following breeds: Large White, Berkshire, Tamworth, Large Black or Middle White, but whichever breed is chosen the sow should be carefully selected.

Dairy Divison

CHILD WELFARE

BABY'S SKIN AND RASHES

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

PRACTICALLY every babe comes into the world with an unblemished skin which a wise mother will make it her business to preserve in a healthy condition, as nothing is sadder than the poor, fretful victim of an irritating rash or infantile eczema.

The skin is a vitally important organ of the body, and if it is unhealthy or damaged the whole body must suffer in some degree, as well as the nerves of the mother and baby, which will become frayed with the irritation. A healthy, clear, active skin, well toned, well tanned and firm, is a fairly sure sign of good health within. A few practical points, then, in connection with the care of babies with especially sensitive skins, may well be given herewith.

Sensitive Skins

All babies have delicate skins, but some are more sensitive to irritation and rashes than others. Commonly, these are the fair type with blue eyes, whose skin will chafe and break out on the slightest provocation. If this skin is not kept clean and dry, or if it is exposed unduly to the sun or wind, a redness or roughness will immediately appear, and this may lead on later to an attack of infantile eczema. The exact cause or causes of eczema is a matter still under discussion, but we do know that mothers have the prevention of this disease to a large extent in their own hands by the correct feeding of babies and intelligent care of the skin.

External Causes of Rashes

(1) Clothing

Every baby should wear a cotton singlet next to the skin, as even the finest and softest wool may cause an intense irritation to a sensitive skin. In the case of babies with any rash or tendency to eczema it is positively dangerous to omit the cotton singlet. Cot blankets must not be allowed to come in contact with the cheeks, but a strip of soft cotton material should be turned over the top of the blanket, like a sheet. Of course, if the baby actually has eczema, complete cot sheets must be used inside the blankets so that the whole of the body is protected from wool. Never let baby's face rest on the shawl or blanket, but provide a very small, low pillow covered with a cotton pillowslip for baby to sleep upon. OVERHEATING is a common cause of irritation, and some babies need careful watching to regulate clothing and bedding according to weather changes—not always easy in our uncertain climate. An hour or two of overheating may cause the skin to flare up distressingly, and will certainly aggravate any existing rashes.

(2) Bathing, Soap, Drying, etc.

Some skins are very readily injured by damp, by hard water, and by strong soap. Contact with damp bibs quickly causes chafed chin and neck, whilst soiled or even wet napkins can very easily cause sore buttocks if not quickly changed. Therefore, it is specially important to train these babies to keep dry and clean. When changing, sponge the skin with a little warm water, and DRY THOROUGHLY. A little baking soda dissolved in water (1 teaspoon to a pint) is good if the skin is slightly scalded, and may be followed by a thin smear of baby ointment. Do not wipe the buttocks on a dry corner of the napkin; this may easily cause an abrasion. Use a damp cloth.

Bathing water may be rendered soft by boiling, or by the addition of a little bran or oatmeal squeezed in a muslin bag. Be very careful to dry all folds and crevices, using the softest of towels. Do not clog the pores of the skin with powder. A smear of baby ointment may be applied if there is any redness, but in general the skin is best kept clean and dry. A lot of ointment may simply make it soft and soggy, and very liable to damage and infection.

(3) Soap

Common or highly scented soaps frequently contain irritating properties, so use only the finest superfatted soap, and use this sparingly. Castille soap is the best for baby's skin. In some cases it is advisable to discontinue the use of soap and water altogether for a period, using instead pure olive oil on soft cotton rag or cotton-wool swabs, gently wiping over the skin once or twice daily. In special cases medicated baths and soaps are ordered, but that is a matter for medical advice.

(4) The Scalp

"Cradle-cap," or scurvy patches on the scalp, if neglected, may lead to eczema; so watch that the head does not become infected in this way. There is no need whatever to be afraid of touching the "soft spot," and the best way to prevent these dirty patches is to wash the whole of the head with firm fingers, then rinse the soap off thoroughly and dry with light, brisk friction. If cradle-cap is already present rub in olive oil or vaseline overnight, then lift the scurf with the edge of a visiting card or small comb. Wash and dry in the ordinary way, and repeat the process every day until the head is quite clean.

(5) The Napkins

These need particular care, and should never be dried or used again without washing. Use no soda or washing powders, no blue or strong soaps. Boil them well, rinse the soap out, and dry in the open air whenever possible. Do not use bulky napkins that will irritate the skin and cause "bandv" legs.

(6) Direct Sunshine and Strong Winds

Remember that abnormally cold, dry winds act as a definite irritant to some skins. Take care that the face is always protected by a shady hat or screen, and go cautiously in exposing a delicate complexion or body to the direct sunlight. Avoid taking the baby with a sensitive skin out in cold or high winds. If it must be done, rub a little lanoline or mild ointment on the cheeks before and after going out.

Internal Causes of Rashes

(1) Over-feeding

often gives rise to simple rashes; but simple skin rashes, in children of the type we are dealing with, may all too easily lead to more serious skin trouble. Eczema usually attacks babies who are inclined to be fat and more or less overfed; it is comparatively seldom seen in thin, undernourished infants. Get expert advice about the diet, whether natural or artificial, and see that he does not exceed his normal average weekly gain.

(2) Excess of Sugar

Excess of sugar or of starchy foods tends to aggravate any skin trouble, but as a rule ordinary mother's milk or humanised milk is best, with a generous allowance of fresh fruit or vegetable juice according to age. Avoid any cane sugar or biscuits, as they definitely irritate these rashes, as also do malt and other white sugar extracts.

(3) Teething

does not in itself cause rashes or eczema, but it is liable to precipitate an attack in a baby with a susceptible skin. Therefore, extra care should be taken of such babies at teething times, along the lines mentioned.

Recipe

A simple baby ointment may be made by mixing equal parts of zinc ointment and castor oil into a smooth paste.

A PAGE FOR THE COOK

By A. C. IRVINE, Mistress Domestic Science, Education Department

PUDDINGS

APPLE SAGO

6 apples	3 ozs. sago
2 ozs. sugar	1 pint water
¼ teaspoon salt	

(1) Peel, core and score apples and put them into a pie-dish or casserole. (2) Wash sago and mix with the water, salt and sugar. (3) Pour all over the apples and stand another pie-dish on top and cook for 1 hour in moderate oven.

SPANISH CREAM

½ oz. gelatine	1½ ozs. sugar
1 pint milk	Pinch of salt
Essence	2 eggs

(1) Cut up gelatine and soak it in the milk for half-an-hour, then stir over fire and dissolve slowly. (2) Add sugar, salt, essence and beaten yolk and cook till slightly thick—but do not boil. (3) When cool, stir in stiffly-beaten whites of eggs, and put into wet mould to set.

PASSION FRUIT CREAM

8 passion fruit	1 lemon
½ oz. gelatine	2 ozs. sugar
Pinch of salt	½ pint milk
1 gill cream	Red jelly (½ pint)

(1) Make jelly and pour into a wet mould. (2) Soak gelatine in milk for half-an-hour, then dissolve slowly over fire. (3) Add sugar, salt, rind and juice of lemon, and whipped cream. (4) Add the passion fruit pulp and pour all in on top of the set jelly. (5) Turn out when set.

HOT CABINET PUDDING

Stale sponge cake	2 ozs. ratafia biscuits
¾ pint milk	4 egg yolks plus 1 white
1 gill cream	1 oz. cherries and angelica
2 ozs. castor sugar	¼ teaspoon salt
2 tablespoons sherry	Essence

(1) Grease a plain mould. (2) Cut sponge cake into fingers and line the mould with them. (3) Decorate bottom of mould with cherries and angelica cut small. (4) Heat milk and add beaten eggs, sugar and salt. (5) Add sherry, crushed biscuits and any scraps of cake, cherries or angelica, and pour into the mould. (6) Cover with greased paper and steam 1 hour. (7) Trim level and turn onto hot dish.

PASTRY

SUET CRUST PASTRY

6 ozs. flour	3 ozs. suet
½ teaspoon salt	5 tablespoons water
½ teaspoon baking powder	

(1) Sift flour, salt and baking powder. (2) Chop suet finely, taking a little at a time and mixing some of the sifted flour with it when chopping. (3) Mix in water with hand or knife to a fairly stiff dough.

SHORT CRUST PASTRY

6 ozs. flour
½ teaspoon salt
½ teaspoon baking powder
4 ozs. clarified fat or butter
4½ tablespoons water

(1) Sift flour, salt and baking powder. (2) Rub in fat with fingers. (3) Add water and mix with hand or knife to a fairly stiff dough.

FLAKY PASTRY

6 ozs. flour
½ teaspoon salt
½ teaspoon baking powder
4 ozs. fat or butter
5 tablespoons water

(1) Sift flour, salt and baking powder. (2) Divide fat into four parts and rub in a quarter to the flour. (3) Mix in water with hand or knife and turn on to floured board and knead well. (4) Roll out an oblong shape. (5) Take another quarter of the fat and put on the dough in little lumps and sprinkle lightly with a little flour. (6) Fold in three, folding from the top down a third of the way, and taking the bottom right up to the top. (7) Turn closed side to the left-hand and roll from you all the time. (8) Repeat 5, 6 and 7 twice.

ROUGH PUFF PASTRY

6 ozs. flour
Pinch salt
¼ teaspoon cream of tartar
6 ozs. butter
3½ tablespoons water

(1) Sift flour, salt and baking powder. (2) Turn flour on to pastry board and cut butter into flour. (3) Return to basin and mix in water with a knife. (4) Do not knead, but roll out three times, folding each time as in Flaky Pastry.

PUFF PASTRY

6 ozs. flour
Pinch salt
1 dessertspoon lemon juice
6 ozs. butter
Yolk 1 egg
Cold water

(1) Sift flour and salt. (2) Beat yolk of egg with fork and add lemon juice to it and enough water to make 5 tablespoons in all. (3) Mix this into flour with hand. (4) Turn on to floured board and knead well. (5) Roll out an oblong shape. (6) Squeeze butter in a cloth and work it into a flat shape with floured hands. (7) Put all the butter on half the dough. (8) Wet edge of dough half-way round and fold in two. (9) Turn closed side to the left-hand and roll from you all the time. (10) Fold in three as in Flaky Pastry, and roll from you. (11) Roll and fold seven times in all. (12) Pastry is better if allowed to stand some time in a cool place between each roll.

GOOD SHORT CRUST

6 ozs. flour
Pinch salt
2 tablespoons water
1 teaspoon lemon juice
4 ozs. butter
1 egg yolk

(1) Sift flour and salt. (2) Beat egg yolk and mix with water and lemon juice. (3) Rub butter into flour and mix in the liquid with hand or knife to a stiff dough. Knead slightly.

BAKED APPLE DUMPLINGS

6 ozs. short crust
6 small apples
3 teaspoons sugar
6 cloves

(1) Make pastry and cut into six pieces. (2) Make each piece round. (3) Peel and core apples and stand one on each round. (4) Put a little sugar and one clove in each apple. (5) Close up pastry round each apple and roll round with hand to make smooth. (6) Glaze top and sides with sugar and water, and stand on greased tray and bake 1 hour in a fairly hot oven at first. (7) Serve on dish with sifted icing sugar on top.

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The Tasmanian

Journal of Agriculture

Vol. VIII Tasmania, 1st November, 1937 No. 4

ALL-AUSTRALIAN COMPETITIONS IN EXPORT LAMBS AND PORKER AND BACONER CARCASES

THE Australian Meat Board has inaugurated two competitions, one in Export Lambs and the other in Porker and Baconer Carcases. The competitions will operate during the 1937-38 export season, and will be open to all States.

Particulars are here published for the information of interested Tasmanian producers.

Conditions and Entry Forms

These are obtainable upon application from the following sources:—

Lambs: The Secretary, Australian Society of Breeders of British Sheep, 1-21 St. John Street, Launceston.

Pigs: The Australian Meat Board, 419 Collins Street, Melbourne, or the Department of Commerce, Melbourne.

Export Lamb Competition

Entries will be judged monthly from September to February inclusive.

Where conditions governing State competitions conducted by various branches of the Society are identical, or are brought into line with those of the All-Australian Competition, entrants in the Commonwealth series will be eligible to compete not only for the All-Australian trophies and cash prizes, but also for the respective State trophies and cash prizes.

The objects of the competition are to enhance the reputation of Australian lambs in the United Kingdom and to encourage producers to breed the types of lambs best suited to the requirements of that market.

The lambs most in demand in the United Kingdom are the "Down" type found mainly among lambs of Southdown strain, but there are also other good marketable types of lambs produced in Australia. The All-Australian competitions will therefore be held in two classes, the first of which will be open to lambs sired by Southdown rams, and the second to lambs sired by other breeds of British rams. Pure-bred lambs of British breed are not considered

B

a commercial proposition for meat export purposes, and entries will therefore be restricted to lambs bred from rams of British breed (exclusively from flocks registered in the recognised flock books) and from ewes of any of the following breeds: Crossbred, Comeback, Corriedale, Polwarth or Merino.

Prizes to be awarded by the Australian Meat Board will be:—

All Australian Grand Champion: Trophy valued at £10, and cash prize of £30.

All-Australian "Southdown" Champion: Trophy valued at £5, and cash prize of £25.

All-Australian "Other British Breeds" Champion: Trophy valued at £5, and cash prize of £25.

The above prizes will be competed for from entries from every State, and will become the property of the producer who, in the opinion of the Judge, secures the highest aggregate of points with two entries. The "Grand Champion" prizes will be open to all entrants in either class, but the winning entries in this class cannot compete for the "Southdown" or the "Other British Breeds" prizes.

The Australian Meat Board will purchase or arrange for the purchase of all lambs accepted for the competition at the highest "bare meat" price per lb. for "spring lamb" of equivalent quality and range of weight realised in Melbourne during the week in which the competition lambs are slaughtered. As a further encouragement to producers to enter the competition, the Board will pay in addition a premium of not less than ¼d. per lb. on all lambs accepted for the competition. The competition will be for pens of five lambs, selected if desired from drafts of seven submitted. Only lambs adjudged of high quality first grade by Commonwealth Inspectors will be eligible to compete.

Judging will take place in London and will include a block test whereby points will be awarded for distribution of fat and lean meat as well as for conformation of carcase and suitability to English market requirements.

Every use will be made of the competition lambs for advertising purposes, and special displays will be arranged in retail shops after the judging is completed.

Porker and Baconer Competition

Entries for the first competition closed on October 15th. Carcases will be judged in London on or about December 15th.

No entry fee will be charged, but only those entries adjudged as of first grade export standard by a Commonwealth Inspector will be eligible to compete. Each entry will include three carcases.

Prizes to the value of £25 will be provided by the Board for award in each class, and two trophies each valued at £10/10/- have been donated. The Board will also pay ¼d. per lb. in the case of baconer carcases as compensation for depreciation incurred by mutilation in judging.

Entries in the porker class must be between 60 lbs. and 90 lbs. dressed weight, and in the baconer class, between 120 lbs. and 160 lbs., including heads in each case.

THE BIOLOGICAL CONTROL OF THE APPLE LEAF-HOPPER

(TYPHLOCYBA FROGGATTI, Baker)

By J. W. EVANS, Entomologist

THE Apple Leaf-Hopper (*Typhlocyba froggatti*, Baker), which is known in Tasmania as the "Canary Fly," was introduced into the island about ten years ago, and is spreading so rapidly that it will doubtless soon become established in every apple orchard within the State.

Its activities are largely dependent upon weather conditions, and it becomes more numerous and causes greater damage in hot, dry summers than those in which cool, wet conditions prevail. However, even in seasons unfavourable to the insect it may increase sufficiently in the second brood, which is on the wing during January and February, to cause the yellowing of leaves and the blemishing of fruit with its excreta.

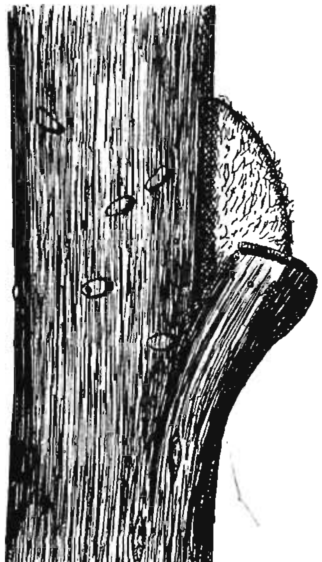

FIG. I
APPLE TWIG WITH LEAF-HOPPER EGGS

Control recommendations which were made in an earlier issue of this Journal have proved satisfactory, but are expensive; hence, an attempt is being made to control the pest by means of a parasite.

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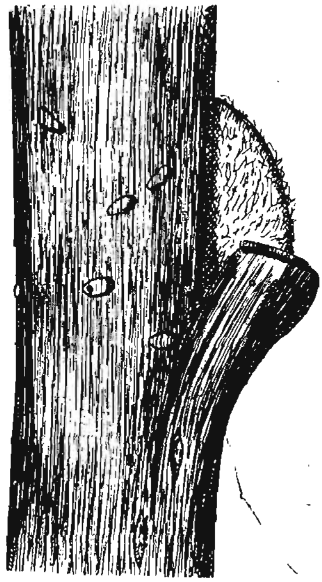

FIG. I

APPLE TWIG WITH LEAF-HOPPER EGGS

Control recommendations which were made in an earlier issue of this Journal have proved satisfactory, but are expensive; hence, an attempt is being made to control the pest by means of a parasite.

In 1932, Mr. L. J. Dumbleton, of the Cawthron Institute at Nelson, New Zealand, noticed that the over-wintering eggs of this leaf-hopper were parasitised by a mymarid wasp (*Anagrus armatus*, Ashmead). Accordingly, he investigated the life-history of the parasite and made an estimate of the extent of the parasitism. He discovered that not only does this wasp parasitise the over-wintering eggs of the leaf-hopper that are laid underneath the bark of young apple shoots, but also the summer eggs that are laid inside the veins and midribs of leaves. Its value may be judged by figures given by Mr. Dumbleton, who estimated that 80 per cent. of the over-wintering eggs were parasitised in the orchard in which he made his observation in 1934, 66 per cent. of the summer eggs in January, 1935, and 90 per cent. of the over-wintering eggs in 1936.

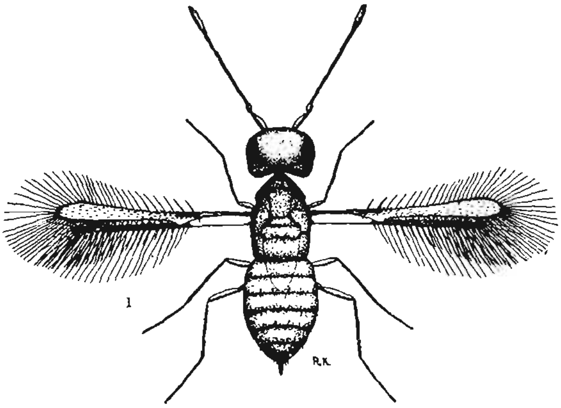

FIG. II
ANAGRUS ARMATUS

Thus, the leaf-hopper is maintained at a low level of abundance and only reaches injurious numbers in occasional seasons when weather conditions may have adversely affected the parasites, or because of a change in the relative abundance of hosts and parasites.

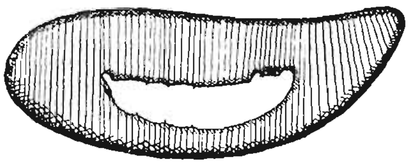

FIG. III
DIAGRAM OF A PARASITE LARVA INSIDE A LEAF-HOPPER EGG

The eggs of the leaf-hopper are about one-thirteenth of an inch in length, and those laid in the autumn cause small swellings in the bark of young apple twigs (Fig. I). The parasite (Fig. II) is a minute wasp, barely visible with the naked eye, which deposits its eggs inside those of the leaf-hopper. These hatch into legless larvæ that feed on the contents of the host-egg. Fig. III is a dia-

In 1932, Mr. L. J. Dumbleton, of the Cawthron Institute at Nelson, New Zealand, noticed that the over-wintering eggs of this leaf-hopper were parasitised by a mymarid wasp (*Anagrus armatus*, Ashmead). Accordingly, he investigated the life-history of the parasite and made an estimate of the extent of the parasitism. He discovered that not only does this wasp parasitise the over-wintering eggs of the leaf-hopper that are laid underneath the bark of young apple shoots, but also the summer eggs that are laid inside the veins and midribs of leaves. Its value may be judged by figures given by Mr. Dumbleton, who estimated that 80 per cent. of the over-wintering eggs were parasitised in the orchard in which he made his observation in 1934, 66 per cent. of the summer eggs in January, 1935, and 90 per cent. of the over-wintering eggs in 1936.

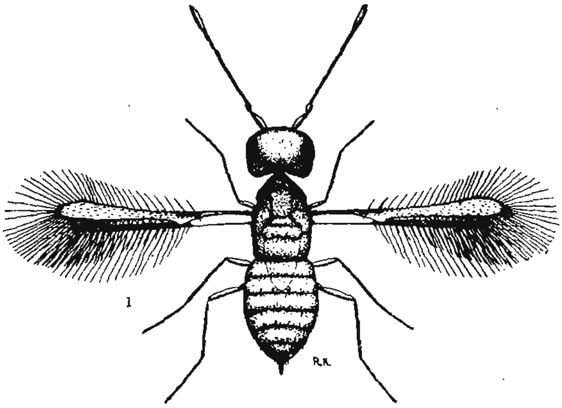

FIG. II

ANAGRUS ARMATUS

Thus, the leaf-hopper is maintained at a low level of abundance and only reaches injurious numbers in occasional seasons when weather conditions may have adversely affected the parasites, or because of a change in the relative abundance of hosts and parasites.

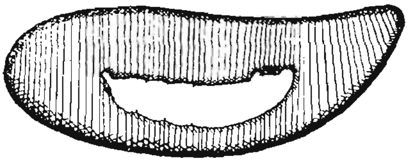

FIG. III

DIAGRAM OF A PARASITE LARVA INSIDE A LEAF-HOPPER EGG

The eggs of the leaf-hopper are about one-thirteenth of an inch in length, and those laid in the autumn cause small swellings in the bark of young apple twigs (Fig. I). The parasite (Fig. II) is a minute wasp, barely visible with the naked eye, which deposits its eggs inside those of the leaf-hopper. These hatch into legless larvæ that feed on the contents of the host-egg. Fig. III is a dia-

grammatic representation of a parasite larva inside a leaf-hopper egg.

Unparasitised leaf-hopper eggs hatch during September, but those containing parasitic larvæ do not give rise to wasps until November or December, by which time the first generation of leaf-hoppers has reached the adult stage and summer eggs are available for parasitism. When the parasites emerge from the eggs of their hosts they cut small round holes as shown in one of the eggs in Fig. I.

Soon after the arrival of the present writer in Tasmania, he approached Dr. D. Miller, Chief Entomologist of the Cawthron Institute, regarding a supply of *Anagrus* (the parasitic wasp) for introduction into Tasmania, and Dr. Miller arranged for Mr. Dumbleton to take charge of the collection and of the despatch of apple twigs containing parasitised leaf-hopper eggs. Two consignments were received during the winter of 1935, and these were divided into four parts, two being placed in private gardens in Hobart and one in an orchard at Risdon, whilst one batch of twigs was kept in the Entomological Laboratory at Hobart for observation purposes.

During the following winter apple prunings from two of the three localities were examined, but no sign of the parasite was discovered. In August of the present year prunings were again collected and it was discovered that the insect had become well established, since parasitic larvæ were found in every twig examined, and in one twig, in which every egg was opened, all the eggs, numbering 120, were found to be parasitised.

Now that *Anagrus* is present in Tasmania, immediate steps will be taken to establish it in a few orchards heavily infested by the "Canary Fly." Later, a general distribution will be made throughout the State.

Many people, when told of the introduction of a new parasitic insect into a country, immediately enquire what the parasite will attack when it has destroyed all of the particular pest for which it was introduced. In the present instance there can be little need for apprehension since the wasp in question is much smaller than a pin's head and its principal interest in life is to search for leaf-hopper eggs in which to deposit its own eggs.

It must also be pointed out that the days of haphazard introduction of insects, even if not of larger animals and plants, have long since passed, and nowadays none are released in a new country unless a full knowledge of their habits is available.

One more fact needs to be stressed. There is no possibility of *Anagrus* exterminating the "Canary Fly"; the most that can be hoped for is that, as a result of its activities, the pest will become so reduced in numbers as to render control measures unnecessary in the majority of seasons.

REFERENCES:

Dumbleton, L. J.: 1934—The Apple-Leaf Hopper—N.Z. Jour. Sci. & Tech., 16 (1), 30.

Dumbleton, L. J.: 1937—Apple Leaf-Hopper Investigations—N.Z. Jour. Sci. & Tech., 18 (12), 866.

THE MAKING OF PASTURE HAY

By C. P. TEBB, District Agricultural Officer

AS a result of the development which has taken place in the establishment of improved pastures in Tasmania, more attention is being paid to the making of pasture hay—either in addition to, or in place of, the customary oaten hay.

The amount of labour and expense which the operation involves depends upon the individual considerations of locality, equipment, weather, other work on hand, etc.; but it is fairly safe to say that generally the operation is a laborious one which requires just as much care as does the harvesting of grain crops. Lack of care may possibly seem to save some time or expense, but if the result is a product of inferior quality the whole operation will have been costly and uneconomic.

In the following discussion the endeavour is to indicate not that there are any hard and fast methods of handling the actual work of haymaking, but that there are some fixed principles that should be incorporated in the work and which govern success.

Stage of Cutting

The stage at which the crop is cut is a most important factor, because upon it depends, in the first instance, the quality of the hay. Plants cut just before they are fully flowering make the best hay. At this stage the nutrients are widely dispersed throughout the stems and leaves; as flowering proceeds, however, the food value of the plant is largely concentrated in the seeding process until finally ripening takes place and most of the feeding value is contained in the seed.

At no time will every plant in the pasture be at the right stage for cutting. The accepted or recommended hay-cutting stages for common hay crops are as follows:—

Clovers.—When approximately half the paddock is in flower.

Vetches.—Ditto.

Ryegrasses.—When the bulk of the paddock is just coming into the flowering stage.

Lucerne.—When about one-tenth of the area is in flower (or preferably when new shoots are starting from the crowns but are still not so long as to be cut by the mower).

A paddock will rarely consist entirely of one species, and it is therefore necessary to adapt the cutting stage according to (1) the composition of the pasture, (2) the weather conditions prevailing and likely to prevail, and (3) the other farm work on hand or pending.

Experiments have been conducted which have shown definitely that, from a fixed area, a smaller weight of hay cut at the right stage or slightly earlier has had a higher total feeding value than

a greater weight of hay obtained late from an adjoining area of exactly similar size and plant composition. Should it appear probable, for any reason, that the harvesting of the hay crop will not be able to receive attention at the right stage, it will generally be wise to decide to err a little on the side of earliness than of lateness in cutting.

It is a further advantage of early cutting that the subsequent growth of the pasture in the same season will be greater than that resulting from late cutting. The feed thus provided can be utilised for weaning lambs.

Curing Process

It is largely upon the curing process that the quality of the hay depends. The ideal is to dry the product while it is green, for at this stage the plants contain the maximum of nutriment and lose nothing but water in drying. The farmer is very largely at the mercy of the weather during this process, but he can do much to minimise losses due to leaching by the sun and rain.

After cutting, and depending on the weather conditions then prevailing, the herbage should be left in the mower swathes sufficiently long for a reasonable drying out to occur in the material lying next to the ground. Raking up too soon will result in difficulty with drying and a tendency for the hay to heat even as it lies in the windrows. Leaving the swathes too long before raking may, on the other hand, result in the bleaching of an unnecessarily large proportion of the herbage by the sun.

As soon as the required amount of drying has taken place, the mower swathes should be raked into rows which may be in the neighbourhood of four or five feet wide and two feet high. They should not be so large that the interior material is prevented from drying, or that the mower swathes have to be raked an excessive distance, with consequent loss of leafage and unnecessary work; nor should they be so small that a shower would penetrate the windrow and necessitate its being turned for drying; the correct size is one that will allow of quick drying with a minimum of exposure of surface material.

If the weather is such as to permit of stacking or baling directly from the windrows, so much the better. However, if the conditions are likely to be unsettled, or if the area being handled is large—or if for any reason the work is likely to be protracted—then, as soon as the windrows have been dried to a reasonable extent within, the hay should be put up into large cocks. This is the safest way of holding hay pending cartage to barn, stack or baler; should either excessive sun or rain be experienced, the maximum of protection will be afforded from leaching, and drying will proceed without hindrance. It is difficult to define the exact size of the cocks; much depends on the type, bulk and yield of the hay being made. In the case of an average crop they may be made two or three yards in diameter and six feet high. The advantage of the windrow is that it can, if rain threatens, be quickly raked, swept or forked into cocks. The latter, if properly topped off with a fork, will turn a large quantity of rain, and it is only under abnormally wet conditions that they will require to be spread out

again. Two men going round together with a fork each can easil turn them over, and when carting commences it is always a gooc plan to roll the cocks over an hour or two ahead of the dray o sweep so that any dampness at the bottoms may dry out.

When to Cart in

This is a matter for careful judgment. The following hints wil afford some guidance in deciding upon the fitness of the materia for carting: Take representative samples of hay (not from the out side or bottoms of cocks or windrows) and wring tightly with th hands. If no juice is squeezed out the hay is just fit; if juicy, no yet fit; if crisp or brittle, overdry. Coupled with this test, how ever, there must be due consideration of the weather. For instance if it is a dull, poor-drying day and the lower parts of the cocks o rows are sappy and not likely to dry quickly on turning, it ma be unwise to proceed.

Storing the Hay

Whether the hay is stacked or baled is entirely a matter fo individual consideration. Some points are of interest in this con nection, however, and may be worth setting out here.

Hay may generally be baled a little sooner than it can be stacked, by reason of the fact that the absence of air circulation in the bale minimises risks of overheating.

Although baling is a slower process than stacking and is deare per ton, the cartage, storage, subsequent handling and feeding ou is so much cheapened and expedited that in many instances it is to be preferred. It is soundly economic.

Unless the baler is part of the farmer's own plant there is a limiting factor in the non-availability of the machine. If a con tractor can bale the hay within a reasonable space of time after it is cut, the hay should be safe in large cocks which can be swept directly to the baler. If there is any uncertainty as to the timely arrival of the machine, however, it is generally advisable to resort to stacking. Once the hay is in the stack it is then, of course, doubtful if the expense of baling from the stack is warranted unless there are some special features to consider, such as subsequent sale, or feeding out to distant paddocks.

When stacking, or storing in the barn, the addition of a little agricultural salt from time to time as the work proceeds greatly improves the hay.

Hay will always heat a little, even when stacked or baled at the correct stage. This heating, provided it is not excessive, is a normal part of the curing process and is desirable.

Careful building and packing of a stack are important, not only from the point of view of appearance and stability, but also from that of even curing of the hay.

Equipment

The efficiency of haymaking, and therefore the quality of the product, is greatly dependent on the equipment available. Where

the area exceeds more than a few acres, the rake and the sweep should be regarded as essentials. The side-delivery rake is especially desirable for windrow work, because instead of dragging the hay it rolls it over. It can also be used for turning the windrows.

The sweep can be used in bulking the hay up for cocks, so that only a small amount of fork work is needed for trimming and topping. If the hay is stacked or baled in the paddock, sweeping is a quick and efficient method of carting in.

Sundry elevating and stacking equipment may become desirable or necessary where hay is made very extensively, but such machinery need not as a rule be considered essential at first.

In conclusion, it should be borne in mind that the best hay is only as good as the pasture from which it was cut. The need for careful making is paramount.

ACTINOMYCOSIS, OR LUMPY JAW

A great deal of economic loss is brought about by the failure on the part of cattle owners to detect this disease in the early stages. Actinomycosis is a common disease in cattle throughout the world. It occurs in isolated cases and does not spread readily from animal to animal, although a number of cases may be reported at odd intervals from one property. It is caused by an organism known as Actonomyces bovis.

The disease is generally confined to the bones of the head and the surrounding soft tissues.

Actinomycosis is generally a disease of young animals, and infection may occur during the shedding of the teeth, or through injuries to the mouth and tongue. The disease is characterised by a suppurative inflammation of the bone and the formation of fibrous tissue. The abcesses in the bone may break externally or internally and discharge a gritty pus.

The jaw bones are the parts generally attacked, although the tongue itself may be the seat of the disease. When the tongue is attacked there is difficulty in feeding and a flow of saliva from the mouth. On examination the tongue is found to be swollen and hard.

When the bones of the jaw are attacked the teeth loosen, the animal is in pain, it cannot masticate its foods properly, and as a consequence wastes rapidly. Therefore, if an affected animal is not soon to become a total loss, early recognition of the disease is necessary.

If a bony lump appears on either the upper or lower jaw, the animal should be immediately fattened and disposed of at an abattoir, where it is subjected to proper inspection.

The disease is generally localised and the head and tongue of an infected animal are condemned.

The disease is a notifiable one under the Stock Act, and all cases should be reported. This course will obviate, in the majority of cases, the total loss of the animal, as steps can generally be taken to fatten the animal and thus obtain nearly the whole of the market value.

PERENNIAL RYEGRASS SEED CERTIFICATION SCHEME

INTRODUCTION OF A MOTHER-SEED CLASS

By R. H. BEVIN, Chief Agronomist

THE perennial ryegrass seed certification scheme has been operating in Tasmania for five years, and it is considered that areas sown down in the inaugural year of the scheme should now be capable of producing seed equal in quality to the New Zealand mother-seed with which they were sown, and which is undoubtedly the most superior ryegrass seed available at present for Tasmanian conditions. In view of this it has been decided to certify as mother-seed the produce of eligible areas, provided the standards of quality in both pasture and seed are satisfactory. The new classification of these areas commences this season (1937-38).

As originally constituted the scheme made provision only for the certification of "permanent pasture" seed (sometimes known as "first harvest"), a class also produced in New Zealand under conditions similar to those ruling here, i.e., from registered areas less than five years old, established from mother-seed.

The quality of certified "permanent pasture" seed is highly satisfactory, and is, indeed, little inferior to that of mother-seed. For ordinary pasture purposes it serves quite as well as mother-seed, and is usually from 4/- to 5/- a bushel cheaper. It is liable, however, to contain a small proportion of seeds which give rise to short-lived and relatively inferior plants, and for this reason its use for seed production purposes from newly-sown pasture is not advocated, owing to the likelihood of perpetuating and increasing the proportion of inferior strains. If the pasture is allowed to attain a reasonable age, however (three to five years), before a seed crop is taken, most of the non-perennial plants will have died out and the resulting crop will be approximately equivalent in quality to permanent pasture seed.

Mother-seed is admirably suited for the sowing down of elite seed-production areas where the intention is to take a seed crop in the first year or the years immediately subsequent to sowing. It is harvested from pastures not less than five years old in which the great majority of plants are truly permanent and of the most desirable type. Pastures seeded with grass of this type can be harvested in the first year after sowing, and thereafter whenever the owner desires, without any significant deterioration taking place in the quality of the seed harvested. This is, indeed, the basis of the certification scheme now in force in Tasmania, under which the only areas immediately eligible for registration are those sown with mother-seed. Having regard to the value of such areas and the limited supply of mother-seed, the cost of the latter, as compared with that of permanent pasture seed, is not disproportionately high, and outlay in this direction is well justified.

New Zealand mother-seed has found a ready market in Tasmania during the last five years, some 2,700 bushels having been purchased for certification purposes alone, while a considerable amount has also been used for the sowing down of ordinary grazing pasture. Growers of mother-seed in this State may be assured of finding a ready market at about the same rates as those prevailing for New Zealand seed, and it is anticipated that the demand, rather than declining, will increase, particularly as the supply becomes more plentiful and the price recedes to the point where the general use of mother-seed for purposes other than seed production becomes an economic possibility.

Areas eligible for the production of mother-seed are those already registered under the certification scheme which have attained the age of five years from the date of sowing. All growers on the register will be notified from the Launceston office of the Department as their paddocks approach this age, and will be invited to submit an application for registration. Upon the receipt of such an application the area will be inspected and a sample of the seed obtained for plot trial and laboratory tests. If the latter are satisfactory the area will then be permanently registered as a mother-seed area and may be harvested under the usual conditions.

Information relating to seed certification may be obtained from any District Officer of the Department, or from the Chief Agronomist, Department of Agriculture, Launceston.

BLACK DISEASE

During the year ending 30/6/37, 198,000 sheep were inoculated against Black Disease on 190 different properties.

For the first time a single vaccine was used. Not only does this vaccine obviate a second mustering and yarding, but it has a greater protective power than the old double dose vaccine.

The attention of stockowners is drawn to the fact that the time for inoculation is again approaching, and that it is advisable to get the inoculations over before the Black Disease season starts.

The greatest losses occur in the months of February, March and April, but some losses may be experienced as early as November and as late as August.

The arranging of the inoculations is a heavy task and is rendered more difficult by the failure on the part of the sheepowners to promptly forward their application forms.

It is desired, in order to economise in travelling expenses, to so arrange the inoculations as to obviate covering the same district twice, and this cannot be done unless application forms are promptly filled in and returned. These forms are now being sent out, and sheepowners are asked to return these to the Chief Veterinary Officer as soon as possible.

TREATMENT OF TREE WOUNDS

By P. H. THOMAS, Chief Horticulturist

TREE wounds, resulting in the exposure of large areas of wood, are comparatively common in orchards. They are of the three following types and are due to the causes indicated.

1. Limb fractures, due to excessive cropping.
2. Bark wounds, caused by the general manipulation of soil cultivation implements.
3. The removal of large limbs, often a necessary operation during pruning and grafting.

Whatever the cause of a wound, it is likely to be infected by fungus which may ultimately cause the death of the tree. Moreover, diseased members become a potential source of infection to others in the vicinity.

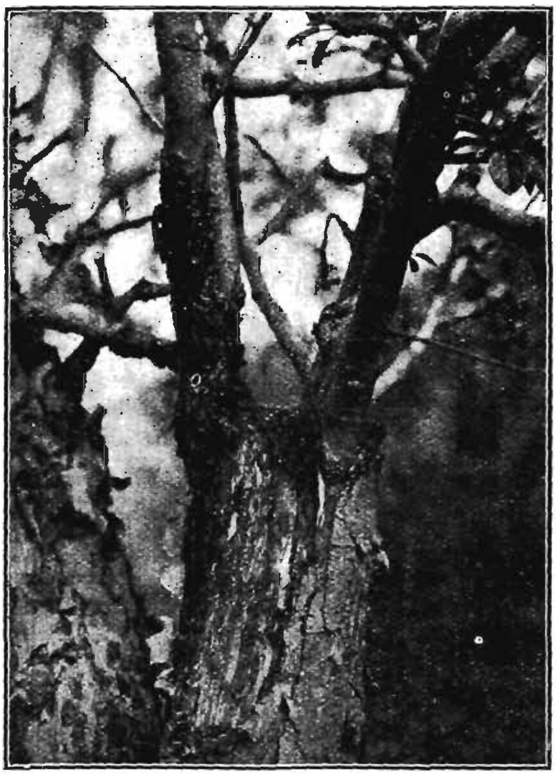

FIG. I

In view of the prevalence in Tasmanian orchards of a fungus known as *Polystictus versicolor*, it is necessary that every precaution be taken in cases of injury to protect the tree from possible infection and assist it in the subsequent callusing and healing.

When removing limbs during pruning operations the following procedure is recommended: If the limbs are large and heavy, make a saw-cut to a depth of half-an-inch on the underneath side. This will prevent premature fracture and splitting during severance. It is important that the saw-cut be made transversely across the limb at an angle which will leave the smallest wound area to heal over. Finally, all rough surfaces should be trimmed smooth with a sharp knife.

Many growers who have carefully taken these precautions have found that the wound has been subsequently infected by fungus, which has slowly invaded the member and, if not arrested, has spread to the trunk, ultimately causing the death of the tree.

Wound infection by *Polystictus versicolor* is generally more prevalent in mature trees than young ones, the fungus appearing to find an ideal host in the partially decayed heart wood which is often present in the former. In other instances infection may commence in the dead bark or wood that forms when a wound is made on a sound and healthy limb.

In each instance the disease becomes parasitic, attacking the living wood around the wound region, killing the bark and cambium, and generally causing serious injury.

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FIG. I

GRAFTED APPLE TREE AFFECTED BY POLYSTICTUS VERSICOLOR

Note the typical symptoms of bark peeling.

During the course of the test it was noted that healthy non-infected limbs, when the terminal wound was treated with bitumen emulsion, were inclined to exude sap. This collected in the form of a blister under the coating formed and had to be released by pressure.

Some of the wounds receiving the glycerine-mercuric treatment were very badly affected, and it is distinctly reassuring to note how the fungal development has been entirely arrested, even where it had originally extended into the main limbs, necessitating the removal of a fair amount of diseased wood and bark with a chisel.

The following are the ingredients for the mixture, which originated in America some years ago as a control for fireblight:—

Glycerine	3 quarts
Water	1 quart
Cyanide of Mercury	¼ oz.
Bichloride of Mercury	¼ oz.

The mixture is prepared by combining the water and glycerine and heating to 170° Fahr. In this the cyanide of mercury is first dissolved and then the bichloride of mercury.

As the mixture has a corrosive effect on metal it is necessary to store it in an earthenware glass container.

The solution is a deadly poison and must be kept away from children and animals.

Application is made by first cleaning up the wound, smoothing rough surfaces and removing as much diseased wood and bark as possible with the aid of a chisel.

The exposed surfaces are then thoroughly painted with the solution, which is quickly absorbed by the tree. Where limbs are affected by fungus it is preferable to cut back as far as possible into healthy wood.

Two applications at intervals of about twenty-one days have proved successful in controlling the worst cases of infection.

WORMS IN SHEEP

By J. A. DUMARESQ, Government Veterinary Officer

RECENT years have seen a great change in grazing practice in this State. Ever increasing areas of rough native grassland have been broken up and converted into improved pastures, and in many cases land which was formerly devoted entirely to agriculture is now growing grass and clover. The increased carrying capacity of these improved pastures has lead to an intensive or semi-intensive system of grazing previously unknown, and three, four or more sheep now fatten on acres which formerly provided a bare existence for one. Increased rates of stocking, however, have brought attendant troubles, one of the most serious of which is parasitic infestation. It is not intended to convey the impression that this occurs only on improved pastures, but heavy stocking is often a critical factor since it tends to induce a concentration of parasites and a high rate of infestation unless preventive measures are taken. Under conditions of heavy stocking parasitic infestation is apt to result in serious losses, and the flockowner is justified in adopting every possible safeguard in order to minimise the trouble.

In order to appreciate the problems involved it is necessary to have some idea of the life cycle of the worms concerned. Their eggs are laid in the bowels of the sheep and are deposited on the pastures with the fæces. At the immature stage the larvæ of the worms hatch in 16 to 24 hours at summer temperatures. These larvæ then undergo two moults, the third stage — which is the infective one, being reached in four to six days in warm weather. Infection of the sheep takes place through swallowing the infective larvæ, which immediately burrow into the walls of the fourth stomach or small intestines. Here they undergo a third moult and finally emerge into the gut after about four days. They then develop to the adult stage and commence laying eggs about three weeks after being swallowed by the sheep.

For development to proceed as above both warmth and moisture are required. Should the eggs be subjected to drying or to very cold temperatures hatching does not take place, but they are extremely resistant and may remain alive for many months and finally hatch when suitable weather occurs. Drying and exposure to sunlight will destroy both larvæ and eggs.

The practical significance of this is that hatching of the eggs and development of the infective larvæ is very slow in winter months, but with the advent of warm spring weather large numbers of eggs which have been lying dormant for months quickly hatch. Moist, warm conditions such as are usually experienced in spring often lead to a sudden mass infection of sheep running on pastures that have been heavily stocked. On the other hand, the hot, dry weather of summer destroys large numbers of the eggs and is the chief factor in cleaning up pastures. For this reason

a wet summer and autumn may be followed by a heavier contamination of pastures than usual during the following spring.

The Worms That Matter

With a perversity common to pests, the intestinal worms of sheep have disguised their significance remarkably well. The large conspicuous tape-worm and the thin-necked worms often found in large numbers in the small intestine cause little trouble, but detract attention from the really harmful small hair and medium stomach or brown hair worms which are the chief causes of trouble in Tasmania. The small hair worms or Trichostrongyles occur in the fourth stomach and the upper part of the small intestine. They are a pinkish or yellowish colour, one-quarter to one-third of an inch long, and unless present in very large numbers can easily be overlooked on post mortem examination if a careful search is not made. The gut should be examined as follows:—

1. Open the fourth stomach, hold it still and carefully examine the fluid contents for signs of disturbance caused by the movement of large numbers of worms.
2. Carefully examine the inside walls of the stomach and small intestines. The small hair worms will be seen lying on the mucous membrane like very short, fine threads. They can often be detected more easily by holding the gut up to the light when examining it.

Often associated with the small hair worm in the fourth stomach are the medium stomach or brown hair worms which are species of Ostertagia. These worms are a dark colour, about half-an-inch long, and hence more easily detected than their small companions.

The Affected Sheep

Young sheep are more susceptible to worms than adults, and the effects of parasitic infestation are usually seen in sheep under 18 months old. At times, however, serious losses also occur in adult sheep which have been run on heavily contaminated pastures or have suffered from poor nutrition. These are usually ewes which have been subjected to the strain of rearing a lamb in the spring when the infective worm larvæ have been picked up. Weaners are especially subject to the small hair worms, as the check of weaning lowers their resistance, especially if the weaners are not put on good feed when taken off their mothers.

The symptoms of worms in young sheep are well known to most people. Affected animals lose condition and show signs of a black scour which, however, should not be confused with the feed scour often seen when the animals are on lush spring feed. In addition, the skin is pale and the sheep have a generally unthrifty appearance. Scouring is often not so noticeable in older sheep.

Treatment

Unfortunately, no drench is 100 per cent. efficient for these worms. Bluestone and nicotine sulphate is 60 to 70 per cent. effi-

cient, while the remainder of the common drenches are practically useless. It should be specially noted that carbon tetrachloride, which is an efficient remedy for liver fluke and the large stomach or wire worm found in the warmer parts of Australia, has no effect against the small and medium stomach worms found in Tasmania. Bluestone alone is also useless.

There is now on the market in Tasmania a proprietary drench containing bluestone and nicotine sulphate, but should the flock-owner prefer to compound a drench for himself he can do so by employing the following formula:—

Bluestone	1 lb.
Nicotine Sulphate (Blackleaf 40)...	16 fluid ozs.
Water	8 gallons

Dose:

Adult sheep	2 ozs.
2-tooths (12-18 months)	1½ ozs.
Lambs (8-12 months)	1 oz.
Lambs (4-8 months)	¾ oz.
Lambs under 4 months	½ oz.

The usual precautions should be observed in using the drench, and special care should be taken not to damage the mucous membrane of the mouth, as the nicotine sometimes causes a severe sore to follow a smaller injury. Sheep should not be starved before drenching.

To obtain the greatest efficiency it is not desirable to double the strength and halve the dose, as is sometimes done. The structure of the ruminant stomach is such that solids entering fall straight into the paunch, but for fluids there are two alternatives —they may go either into the paunch or be "short circuited" straight to the fourth stomach. This is brought about by two folds which form what is known as the œsophageal groove. These run from the entrance of the gullet in the paunch to the bible and so straight to the fourth stomach. If these folds are closed—and bluestone has the power of closing them—fluids pass straight to the fourth stomach.. The closing, however, may not be instantaneous or complete, and for this reason a large dose slowly administered has a greater chance of passing to the fourth stomach, whereas a small volume which is often "shot" down the sheep's throat quickly is more likely to fall into the paunch and be wasted.

Drenching should be systematic and, in cases where experience has shown the infection of lambs to occur regularly, may commence when lambs are six weeks old. In such cases it is also advisable to drench the ewes before lambing. Treatment may be repeated at intervals of a month or three weeks where necessary. With badly affected lambs, or weaners, it may even be necessary to drench as often as every fortnight.

In all cases, however, the main method of attack should be through correct pasture management and adequate nutrition.

Prevention

This is largely a matter of management. The chief factors to be considered are rate of stocking, nutrition, and the relation between weather and the life cycle of the worms.

1. **Heavy stocking,** which is necessary if the fullest use is to be made of improved pastures, quickly leads to a heavy accumulation of infective worm larvæ and eggs. For this reason, rotation of paddocks should be the rule and long continued periods of stocking should be avoided. It is futile to drench sheep while they remain on pasture from which they are being continually reinfected.

   On properties where parasitic troubles are usually experienced with weaners it should be the aim to provide a good pasture which has been left unstocked during the summer or has been stocked with cattle. For this purpose pastures which have been shut up early and cut for hay, or clover sown with a cover crop, may be used, the latter after the cover crop has been harvested.

2. **Nutrition.**—This plays a big part in the resistance of the animal to parasitic infection. Good feeding is one of the best preventatives against worms, and in its absence treatment is seldom effective. Here again it may be pointed out that adequate feeding is particularly necessary for weaners in the early weaning stages. Should serious trouble be experienced on pastures which have become heavily contaminated with worms through continuous stocking, it will probably be best to put the most seriously affected animals on rougher country which has only been lightly stocked, and give supplementary feed such as chaff or oats. This reduces the degree of infestation to a minimum and gives the drench a chance to overcome the parasites.

3. **Weather.**—The influence of weather on the eggs and larvæ which lie on the pasture has been explained. Since infection of the sheep is greatly increased with the advent of warm spring weather, regular systematic drenching of ewes and lambs should be undertaken at this time on properties which annually experience trouble, although the sheep usually do not show evidence of the infestation till later in the summer. At this time dry weather may have caused the feed to go off, and steps must be taken to ensure that the flock receives adequate nutrition if parasites are to be overcome.

Briefly, the main points in the control of worms are as follows:—

1. Avoid continuous heavy stocking; practice rotation of pastures.
2. Provide good feed.
3. Adopt systematic drenching where necessary.

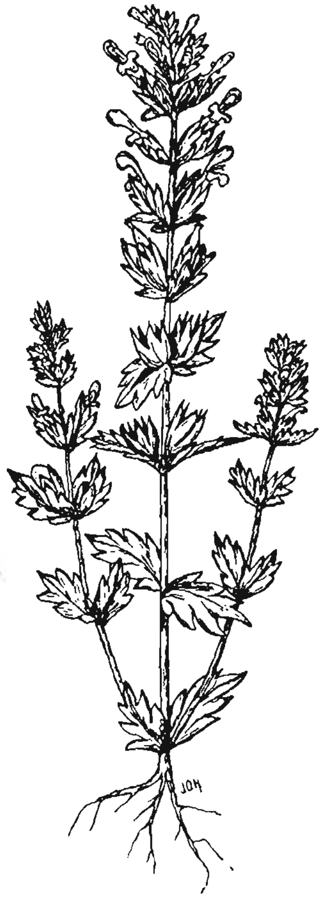
COMMON FARM WEEDS: THEIR CHARACTER AND CONTROL

By R. H. BEVIN, Chief Agronomist

THE BARTSIAS

ONE of the more common weeds found on our soils in the wetter districts is the yellow-flowered "Tar Weed," so called because of the sticky nature of the leaves. Generally speaking, it is on flats and at the foot of slopes that Tar Weed is most commonly found, and this indicates that faulty drainage and waterlogging are conditions which encourage its growth.

Tar Weed (*Bartsia viscosa*)



Common Bartsia (*Bartsia latifolia*).

Bartsia viscosa.—Tar Weed, or Sticky Bartsia, to give the plant its botanical appellations, is a tall-growing annual with leaves long and coarsely toothed and set in close to the stem. The leaves

are covered with sticky hairs which, because of their glutinous exudate, give to the plant the expressive and highly descriptive name of the weed.

The flower head, which opens in early summer, consists of a long spike on which the yellow florets are set alternately. The petals are arranged in a tube opening out to a pair of lobes turned upwards and downwards respectively, the lower lobe being the larger of the two. As a result of the compound nature of the flower head *Bartsia viscosa* sets a great many seeds, and it is from these that the plant spreads and multiplies.

Bartsia latifolia (Common Bartsia)

This member of the family is smaller and less conspicuous than the taller-growing viscosa, but in the last few years evidence of its spread has become apparent on some of the lighter soils in the North.

The plant is a small, erect annual rarely exceeding eight to ten inches in height, and having a habit of growing in thick clumps which if disregarded soon spread until, as has been seen in some cases, the weed covers whole paddocks and flourishes on roadsides.

The stem and leaves are much smaller than is the case with viscosa, but the sticky characteristic remains, and the plant is rarely eaten by stock. The flower head is short and compact, and consists of a number of small, reddish-purple florets set close together. Again the floral arrangement allows of a heavy setting of seed.

Control of Bartsia

The fact that the Bartsias are not relished by stock, and the fact that they flourish amid pasture plants, makes their control by grazing difficult if not impossible. However, the plants are annuals, and if prevented from setting seed they may be substantially checked in one season. A certain carry-over of seed from previous years will result in a further crop, but after two or three years' control the weed stand definitely thins out.

The practice recommended, therefore, when the Bartsias are assuming menacing proportions, is to run the mower over the infested area while the plants are in flower and before the seed is set. Where a pasture is shut up for hay, the cutting of the grass and clover would act efficiently as a check to the annuals' seeding. In addition, where *B. viscosa* is in evidence steps should be taken to ensure the removal of excess soil water by adequate drainage.

SOFT TURNIPS FOR SHEEP

By R. A. SHERWIN, Senior Agricultural Officer

WITH the extended development of artificial pastures in most parts of Tasmania, the provision of supplementary fodder is of increasing importance. In fact, it is essential if farmers are to get the best results from their improved pastures. As more grass and clover is sown and stock numbers are increased to cope with the extra feed produced at certain periods of the year, the effect of dry seasons or the failure of pastures to produce sufficient food during the winter, is much more serious than in the days when reliance was placed on natural pastures. For the farmer to obtain the full benefit of his pastures he must stock to the highest point he considers safe. This point of safety depends on the ability of the property to meet periods of shortage—expected or unexpected.

Reserves of hay, silage or grain may be made in either instance, but in this article it is proposed to deal with the growing of soft white-fleshed turnips for the period of expected shortage—namely, the winter. This type of turnip has been grown to a limited extent in Tasmania for a number of years, but only recently has it become a crop of major importance. It has a very definite place on properties which have been developed or partially developed, as a cheaply grown crop which will provide a bulk of feed in June, July and August when pasture growth is limited. Normally, in these months the ewes are out on the runs or confined to the paddocks, where they subsist on whatever pasture growth there is, possibly supplemented by some hay, chaff, or green oats. The presence of a paddock of turnips at that time would ease the feed position very considerably and result in improved returns from the stock. Increased carrying capacity, higher lambing percentages, heavier wool returns, and improved condition of stock should be evident where turnips are managed properly.

Carrying Capacity

This, of course, depends on the success of the crop and the type of feeding practised. Where turnips are made the principal item of winter feed a good crop should carry 20 to 25 sheep per acre for a period of three months; but in the lighter rainfall districts it would be safer to estimate the carrying capacity at 15 sheep per acre for the same period.

Method of Feeding

Different methods will apply on different properties, but generally the best results will be obtained where the sheep are given a run off in addition to the turnips. This run off should provide a certain amount of dry feed, and in most cases it should be supplemented with a ration of straw, grass, hay or chaff, even if the amount of this ration is only ½ lb. per sheep per day. The sheep

should be turned on to the turnips for a period of two to four hours per day, and then only after the frost has disappeared. The optimum period of grazing is, of course, just as long as the sheep take to fill themselves, and just before they start to lie down.

It is not desirable to keep sheep on turnips all the time, but such is sometimes done with fattening sheep. Turnips should be regarded as a store food and not a fattening one, though sheep will fatten slowly on them provided they are given a good supply of hay or chaff in addition.

Occasionally turnips are pulled and fed in other paddocks. This is laborious work, but it results in very little wastage and may be warranted in very wet periods or times of acute shortage.

The best results in feeding are to be expected when the sheep are given the run of part of the crop at a time, and not moved on until they have cleared the area. This reduces to a minimum wastage caused by trampling, and enables the crop to be utilised completely as the sheep move along. For this method subdivision is essential. Cyclone fencing, together with iron or wooden stakes, is very suitable for this temporary subdivision. Twine can replace staples as a method of attachment of the wire, and consequently the fence can be moved very quickly.

As the bulbs are eaten down to ground level, it is desirable to cultivate the area with a spring-tyne cultivator to bring the shells to the surface and ensure the full utilisation of the crop. Some growers adopt the practice of feeding first with the weakest-mouthed sheep and, when the tops are finished, of bringing on the sound-mouthed ewes, and possibly finishing up the shells with wethers or cattle. This, however, entails more subdivision and management, and is not likely to be adopted on many properties.

Where sheep have not previously been fed on turnips, some days may elapse before they will start to eat the bulbs. During this time they will probably get a certain amount of picking in the paddock, and before long they will take to the turnips readily.

Suitable Soils and Climate

Soft turnips can be grown with a rainfall of 20 inches upwards, but with a rainfall of 35 inches and over their place can be taken by the more nutritious swede.

As turnips grown for winter use have to grow during the dry summer months, they should be confined to soils which have the ability to retain moisture under conditions of proper cultivation. Further, it is recognised that turnips will do best on new land, or land broken out of pasture which has a good turf. On these soils turnips have the advantage of bringing concentrated stocking to the land and the resulting consolidation is most beneficial. Paddocks which have been subjected to continuous cropping in dry districts should be avoided. High soil fertility is not essential.

Cultivation

Land intended for soft turnips should be ploughed in the early winter and allowed to weather until the spring. This is most nec-

essary on new land. During the spring and early summer it should be broken down and thoroughly cultivated. Early cultivation should be deep, but in the last six weeks only surface working should be attempted. This, when properly carried out, will give good consolidation, moisture conservation, and a fine seed bed for the small seeds.

The area should be rolled before sowing, which can be done with the drill, mixing the seed with the manure and taking care to drill no deeper than one inch. Drilling should be followed with light harrows. If preferred the seed and manure can be broadcast, but the strike is not so certain and the young plants do not get the benefit of the concentration of manure near their roots.

Seeding and Manuring

Seeding varies between 8 and 12 ozs. per acre, but a good sowing is 10 ozs. Where conditions are good for germination even this may be too heavy and result in a very thick crop of small turnips. A too dense stand may, however, be reduced by harrowing the crop before the turnips are more than two inches high.

Basic phosphate is to be preferred to superphosphate, as under dry conditions superphosphate may burn the young seedlings and reduce the germination very considerably. Certainly no more than 1 cwt. of superphosphate should be used unless some is broadcast, either at the time of sowing or after the turnips are up. This latter treatment often gives very good results, and is worth trying. Basic phosphate may be applied more heavily at sowing than superphosphate. Precautions should be taken not to leave seed mixed with manure overnight, otherwise the germination may be impaired.

Varieties

Several varieties have proved themselves suited to Tasmanian conditions, and it is very difficult to recommend any one in preference to others. Imperial Green Globe, Purple Top Mammoth, and Lincolnshire Red are all good varieties.

Time to Sow

In the case of turnips for winter use, sowing should take place during December. Early sowings in this month afford greater opportunity for rains to start the crop well, and may be expected to result in a more sturdy plant, capable of growing through the drier months.

Attention might well be directed to the value of this crop for autumn feeding on well developed properties. It is generally recognised that pastures will be most productive if they are allowed a good start before being grazed; and yet it is most difficult, in many cases, to spell pastures in the autumn, due to the limited quantity of feed and concentrated stocking. Turnips sown in September will provide a bulk of feed in February, March and April, and allow many of the sheep to be kept off the pastures

until they are well started. If properly managed this crop will flush the ewes at mating time.

General

Soft turnips are subject to Blight (Aphis), but not to the same extent as rape or swedes, and in consequence can be considered a fairly safe crop. Should seasonal conditions be particularly unfavourable and the crop prove a failure, the land can be cultivated in February and March, and, with only a limited amount of preparatory work, sown with oats. The only loss will thus be the cost of the turnip seed and a certain amount of work.

The practice of lambing ewes on turnips is not advised. Ewes may be given one or two hours a day on the crop when they are lambing, but they should be turned off to lamb in a clean paddock or run for the rest of the day.

One occasionally hears the remark that the wool will be spoilt if sheep are grazed on turnips. This is not the case when they are left on only as long as they are feeding, and they do not have the chance of lying down in the mud or dust. Actually, the fact is that, properly managed, turnips will add to the wool cheque rather than subtract from it.

In conclusion, it may be stated that soft turnips, when properly put in, can be grown successfully on most farms and bigger holdings as a valuable supplementary feed for both autumn and winter. They increase the carrying capacity of the property at its lowest period, they are cheap to grow, and they have the advantages of consolidating the soil and adding to its fertility. Further, they will usually fit well into any system of farm management.

Emphasis must be placed on thorough soil preparation. Disappointing crops can, in many cases, be traced to failure to realise this most important factor.

SUBTERRANEAN CLOVER SEED PRODUCTION

In view of the importance of the establishment of this industry in Tasmania the following brief history of the movement since its inception may be of interest to producers and serve as a record of the difficulties encountered and the co-operation which led to their being successfully overcome.

The following review has been supplied by the Subterranean Clover Committee of the Tasmanian Producers' Association, Longford.

THE first serious attempts to harvest Subterranean Clover seed in Tasmania date back to a period some little time prior to 1930 when increasing expansion in the sowing of the clover, and the resultant keen demand for the seed at lucrative prices, first began to be apparent.

At that time the harvesting of the crop and the production of a high-grade sample were full of problems. Little was known as to what implements were best suited for harvesting; the removal of the seed from the tough burrs in which they are contained, its final separation from the inner envelope in which each seed is covered, and especially the removal of soil particles, gravel and other impurities from the threshed seed presented apparently insoluble problems.

At first harrows, hand rakes and stable brooms were used for harvesting, and, while they proved effective in gathering the burrs, they were slow and very costly. The old-fashioned tumblers and heavy horse rakes and other implements were later tried in an endeavour to get the work done more expeditiously and less expensively, but with little practical success, since they had to be followed by the hand-rake and broom to collect the burrs off the ground and from the surface inch of the soil.

A flat-toothed hand rake designed by Mr. R. H. Bevin proved to be more effective than the garden rake, and this was used extensively until machine harvesting methods were later developed.

The seed, having been gathered by these slow and costly methods, was threshed in the ordinary grain threshing machines, but these proved unsatisfactory because they were unable completely to remove the seeds from the tough, fibrous burrs, which resulted in a considerable loss of seed. A further difficulty arose on account of the fact that the gravel, dirt and sand which passed through the machines in large quantities with the burrs were injurious to the bearings and machine owners became reluctant to undertake this work.

Following upon a review of the position, the Longford branch of the Agricultural Bureau arranged, in 1930, with the Department of Agriculture, for an experimental clover huller of New Zealand manufacture to be made available to farmers for threshing Subterranean Clover. This machine was designed for threshing other species of clover in which the seed is more or less loosely invested

by an easily ruptured pod or other type of seed vessel, and was not adapted for dealing with the tough, heavy burrs of Subterranean Clover and with the large amounts of dirt and stones, etc., collected with them off the ground. It was slow and did not recover a high percentage of seed, but proved inexpensive to operate and no difficulty was experienced with parts vulnerable to dirt and dust.

The machine was used in the 1930 and 1931 seasons, when good returns were obtained from hand-raked and broom-swept paddocks. It was of use mainly in demonstrating that special threshing machinery was required to cope successfully with the peculiar difficulties of the project.

The fact that Tasmania was purchasing annually something like 50 tons of subterranean clover seed from outside sources where efficient harvesting and threshing methods had obviously been developed, persuaded a number of members to make a serious bid for a share in this lucrative business, and during 1932 and 1933 enquiries regarding harvesting and threshing were continuously made. Particulars and prices of British, American, New Zealand and South Australian machinery were obtained, and as a result of the information thus gained it was decided to have a certain threshing machine of South Australian manufacture, which was specially designed for the work, inspected in action.

In 1933, Messrs. R. H. Bevin and E. Ellis went to South Australia to report on the machines, to investigate the methods of harvesting employed there, and to enquire into the cleaning of the seed. The expenses connected with this project were borne by the Government and the Agricultural Bureau. The reports of these gentlemen, and an offer made by Mr. Ellis to purchase a threshing machine from South Australia, provided a reasonable amount of work was guaranteed, led to the appointment of a committee to make arrangements for harvesting seed during the approaching season.

The greater part of the season proved unfavourable for harvesting operations, but an improvement in conditions set in towards the end and the seed produced at this stage yielded lucrative returns to the growers. However, the greatest difficulty was experienced in cleaning the seed to a satisfactory standard, despite the assistance rendered by Mr. A. W. Monds, who spent much valuable time and incurred heavy expense in an endeavour to cope with the problems encountered.

In the following year the Department of Agriculture inaugurated a seed certification scheme under which seed was harvested only from paddocks which had been officially inspected and found to be free from Lucerne Flea and Red-legged Earth Mite. This development helped materially in placing the industry on a sound footing.

The Department of Agriculture was responsible for a great many experiments and trials of different harvesting implements and methods, and the successful developments which have taken place on this side of the industry are due in a large measure to its efforts and co-operation. In addition, a considerable body of seed investigational and analytical work was carried out, particularly with

reference to hard and dormant seeds, mechanical seed injuries, and the nature and proportion of impurities.

Eventually the Government made arrangements for the manufacture in Tasmania of what is now known as the "Oldrey" Springtooth Grader, and arranged for a number of these implements to be sold to the Clover Committee on terms covering some years. This enabled the Committee to hire them to producers, who were thus spared heavy capital outlay for implements which would only be used for a short period in each year. The graders, together with horse-drawn rotary brooms, have made harvesting much simpler and far less costly than the old methods.

From the point of view of marketing the seed, one of the greatest disabilities which had been encountered was the difficulty of cleaning it to a satisfactory standard. After many methods of a more or less disappointing nature had been tried by various interests, Mr. George Ellis, of Longford, solved the problem with the invention of a first-class plant which turned out a sample that could hardly be surpassed for cleanliness. As a result of this development, combined with the Government Certification Scheme, Tasmania is now able to supply seed for which there is a strong and growing demand domestically, while there is evidence of appreciation of its high quality and freedom from Lucerne Flea and Red-legged Mite forthcoming from the seed trade on the Mainland and in New Zealand.

Last year Mr. E. Ellis purchased another Subterranean Clover threshing machine which operated in the Campbell Town, Ross and Fingal districts, while the first machine was kept fully employed in the Longford, Evandale, Carrick and Macquarie Valley areas. In addition, Mr. George Ellis has doubled the capacity of his cleaning plant to cope with the increased output. The handling and selling of the seed is in the hands of Messrs. Monds and Affleck Pty. Ltd., and Mr. T. B. A. Monds, a member of the firm, gives his personal attention to the conducting of the operations of the Committee.

Some idea of the progress that has been made in production can be gathered from the quantities produced since the first machine was purchased:—

	Tons	Value £
1934	10	1,200
1935	2	260
1936	25	3,000
1937	60	8,400

The percentage of second grade seed in 1937 was only 6½ per cent. of the total seed harvested. Since November, 1935, the production of seed has been under the control of a committee appointed by the Tasmanian Producers' Association, which took over this activity when members of the Longford Branch of the Agricultural Bureau formed their own Association. This committee has full responsibility for the handling and disposal of all seed, through its own agent and broker. The industry is still in its infancy and will, it is hoped, be still further developed for many years to come.

Its development is a great achievement which could not have been accomplished without a controlling and organising body, nor could it have been brought to its present stage without the assistance of the Government, the officers of the Department of Agriculture and the Agricultural Bank.

If conditions are favourable it is intended that a further threshing unit be purchased to operate in Southern districts, particularly around Kempton and in the Derwent Valley.

Acknowledgments

The Committee wish to acknowledge their indebtedness to the Department of Agriculture, in particular Messrs. E. R. Hudson, R. H. Bevin, A. H. Woodforde and R. A. Sherwin, whose efforts to forward the industry have been keenly appreciated by the farmers concerned.

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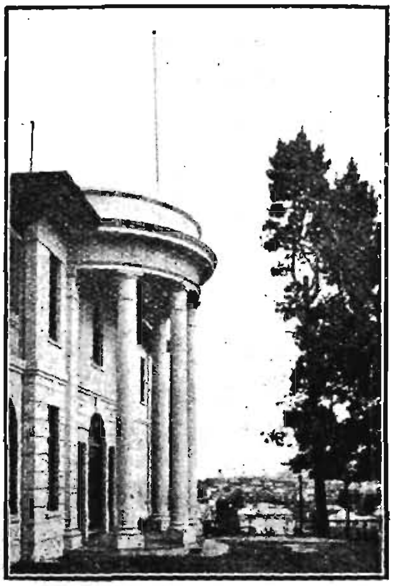

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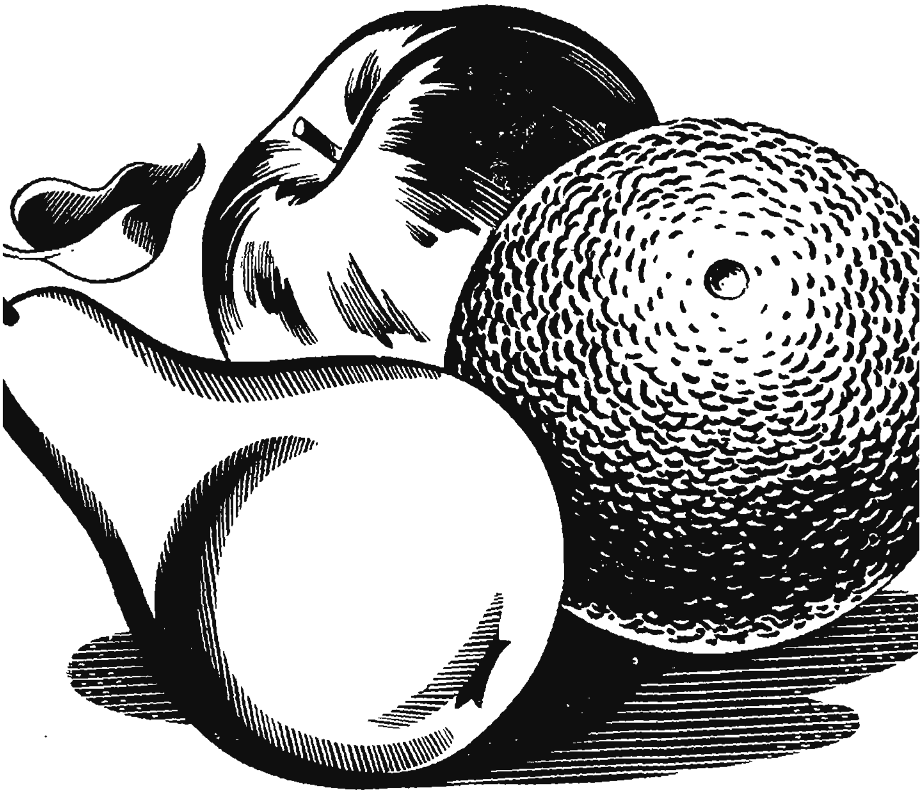

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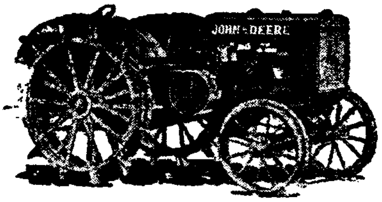

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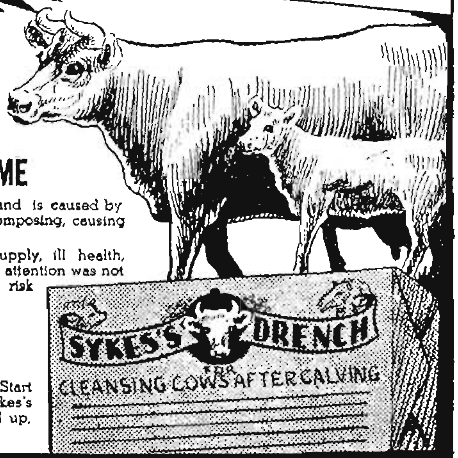

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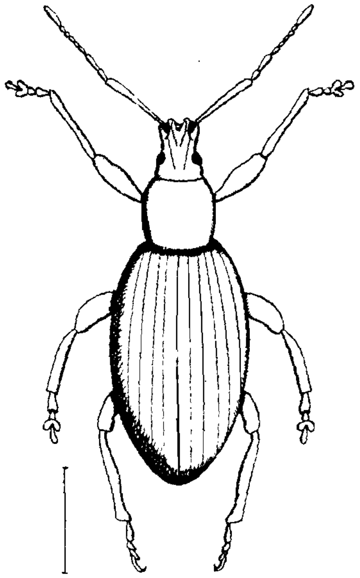
STRAWBERRY BEETLES

By J. W. EVANS, Entomologist

Introduction

FOUR species of beetles have been recorded as pests of strawberry plants in Tasmania. Of these, the one responsible for the most serious injury is the introduced weevil, *Otiorhynchus sulcatus* (Fabr.). Two indigenous weevils, *Rhadinosomus lacordairei* (Pasc.) and *Rhinaria perdix* (Pasc.), are occasional pests of minor importance, whilst the Metallic Flea Beetle, *Haltica pagana* (Blkb.), in certain seasons becomes so abundant on strawberry plants as to render control measures necessary.

In the account that follows, only three of these pests are considered, since one of them, *Rhinaria perdix*, is now of such rare occurrence as not to merit attention.



STRAWBERRY WEEVIL
(*OTIORHYNCHUS SULCATUS*)

OTIORHYNCHUS SULCATUS

Distribution and Description

This strawberry beetle is of European origin, but now also occurs in North America, New Zealand, Australia and Tasmania. It is not certain when it was first introduced into this State, though it is known to have been present for nearly sixty years. The adult beetles are about half-an-inch long, brownish-black in colour, with

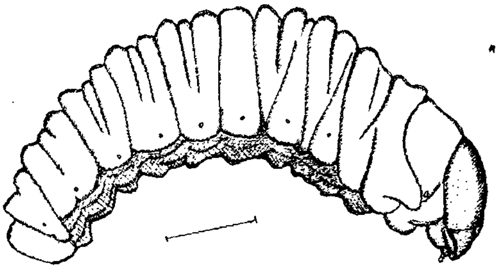
the thorax covered with small tubercules and the wing-cases with coarse punctures.

The larvæ, or grubs, are white in colour and legless. *O. sulcatus* has a wide range of food-plants, and although known in Tasmania principally as a pest of strawberries, has been recorded elsewhere as attacking raspberries, rhododendrons, irises, cyclamen, primulas and yew trees.

Life History

Adult beetles appear in the spring, from the middle of October until the end of November, in an early season, and from the middle of November until the middle of December in a later one. They are active only during the night, when they emerge from the soil and from under debris, and feed on strawberry leaves. Egg-laying commences about six weeks after the first appearance of the beetles and continues over a period of three months. It is not preceded by fertilisation, since only female beetles occur.

The eggs, which are white in colour and spherical, are laid in crevices of the soil, in batches of from five to twelve. A single weevil can lay as many as a thousand eggs. These hatch in from one-and-a-half to three weeks, and the young larvæ at once begin to feed on fine rootlets. Later they cut and eat larger roots, and may even penetrate into the crowns of plants. Larvæ from eggs laid early in the season are full-fed by the end of the summer, and



LARVA OF STRAWBERRY WEEVIL

pass the winter as "prepupæ" or resting larvæ, in cells situated about two inches below the soil surface. Larvæ from eggs laid late in the season do not complete their development until early in September, when they form cells in which they pupate during the following month. Although there is only one generation a year, a few beetles may survive for two seasons and oviposit (lay eggs) during both, hence a certain number of grubs will be found in the soil at periods other than those mentioned above.

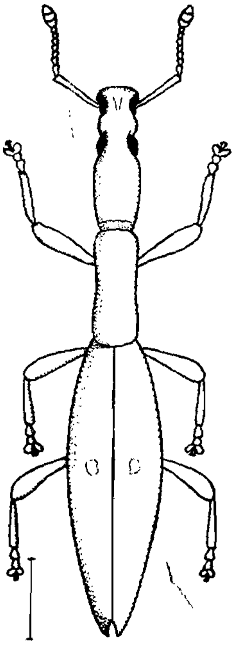
Control

The larvæ, in addition to feeding on the roots of strawberries, feed on many weeds, especially sorrel, dock, plantain and dandelion, hence clean cultivation is essential. The insects themselves can most easily be destroyed by cultivation whilst in the "prepupal stage, therefore a thorough hoeing during late September is

recommended. If, after hoeing, poultry are allowed to run over the cultivated ground, an especially high mortality will result.

Lead arsenate cannot be used with safety on plants bearing developing fruit, but the beetles can be destroyed by the use of poison baits. The following bait is recommended: Bran 1 lb., molasses 1 pint, calcium arsenate 4 ozs., water 2 quarts. The bran should first be mixed with the calcium arsenate and the molasses dissolved in the water. The bait should be scattered round the plants during the late afternoon or evening, but should not come in contact with the leaves. Seventy-five pounds of bait are sufficient for an acre, or a tablespoonful to a plant.

For control measures to be effective the beetles must be destroyed before they have laid any eggs, hence the bait must be applied about a month after the first appearance of the adult beetles, or, if their presence has not been noted, during the middle of November. For heavy infestations a second application is necessary from three to four weeks after the first.

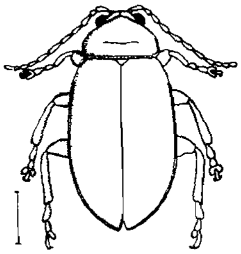


THIN STRAWBERRY WEEVIL
(RHADINOSOMUS LACORDAIREI)

RHADINOSOMUS LACORDAIREI

This strangely-shaped weevil occurs in every State, and although its usual food-plant is eucalyptus trees, it will sometimes attack strawberry plants. It is dark brown in colour and usually has a white spot on each wing case. The grubs are legless and white in colour. They tunnel in the stems and sometimes make their way to the crown, causing the eventual death of the affected

plants. Sickly plants should be burnt, and young plants set out in plots known to harbour this beetle may be protected by placing tobacco dust in the holes in which they are planted.



METALLIC FLEA BEETLE
(HALTICA PAGANA)

HALTICA PAGANA

The Metallic Flea Beetle is a native insect about a quarter of an inch long and greenish-blue in colour. Whilst its principal food-plant is the "Buzzy" plant *(Acaena sanguisorba)* it is known also as a pest of various garden plants and of strawberries.

The beetles appear during the early summer months, and lay their narrow, yellow eggs in clusters on leaves. The eggs give rise to black grubs with three pairs of legs; these, as well as the adult beetles, feed on the leaves and fruit of strawberry plants.

Control can be effected by the application of derris dusts, several brands of which are now on the market. These dusts can be used right up to the time that the fruit is picked—unlike lead arsenate, which can only be used with safety on plants prior to the development of fruit.

Derris dust will not only kill the beetles and grubs on treated plants, but will protect them for a period from further attack.

TOBACCO CULTURE

SEASONAL NOTES (December-March)

By D. H. MALCOLM, Senior Agricultural Officer

[Continued from page 146, August, 1937, issue]

Budworm Control

CONTINUING these notes, which in the last issue of the Journal concluded with cultural methods in the field, we find ourselves at the stage when the budworm begins to make its appearance and it becomes necessary to adopt precautionary measures. As its name implies, the budworm attacks the bud or growing point of the plant which it destroys, and effectively prevents normal growth. This pest is, however, easily controlled by means of poisoned bait.

The bait is prepared by mixing 1 lb. of lead arsenate with 20 lbs. of pollard, and is shaken into the growing point of the plant by means of a jam tin with nail holes in the bottom. For convenience in working the tin may be fastened to a stick about 2 ft. 6 in. in length. Where it can be procured, maize meal will be found more effective as a base for the bait than pollard.

Mosaic

Perhaps owing to our mild climate the incidence of plant viruses seems to be more than usually severe in Tasmania, and in certain seasons this group of diseases has caused serious economic loss.

The most common virus in tobacco is the form known as "Mosaic," which is characterised by a light and dark mottling of the green leaf. Infected plants are usually stunted, and often narrow in the leaf blade. The yield from infected plants is low, and such leaf is of little or no value, failing to develop a good colour when cured.

Some writers claim that the virus causing mosaic will remain active in tobacco trash remaining in the fields from season to season, but there is no conclusive evidence that any great amount of infection occurs in this manner in Tasmania.

Under our conditions mosaic is, to a great extent, a disease of seed-bed origin, and is transmitted from plant to plant on the hands of workmen, and on implements, machinery, etc. As a preventive of mosaic, seed beds should be gone over thoroughly from time to time and any plants showing signs of infection removed and destroyed. It is known that the virus will remain active in manufactured tobacco, and smoking should be prohibited by workmen engaged at the nursery beds. Furthermore, people handling infected plants should wash their hands thoroughly with disinfectant before handling healthy plants.

Similarly, after transplanting, one or two men should be detailed to go through the beds in advance of working parties and remove and destroy all infected plants. If these precautions are adopted the degree of infection in the mature crop should be insufficient to cause any appreciative loss.

Experience has shown, however that where mosaic infected and healthy plants are handled indiscriminately, the degree of infection will probably reach as high as 80 per cent. by the end of the season.

Disbudding and Topping

When the plants have been in the field for about eight weeks suckers will be noticed in the axils of the bottom leaves. These should be removed in order to aid the development of the main leaves, which are the ones used for commercial purposes. If the suckers are allowed to remain on the plant not only will maturity be delayed, but also the main leaves will be thin and papery, and considerably reduced in size.

At the same time as the first suckering is carried out, some growers follow the practice of "priming"—i.e., removing the basal leaves which have no commercial value. It is problematical whether anything is gained by priming, as these small leaves will ripen and drop off the plant in any case before the main harvest commences. It is claimed by some growers that "Blue Mould" usually makes its appearance on the bottom leaves, and by priming these the chances of infection are reduced. This may be so, but on the other hand the risks of spreading mosaic in handling the plants are very real, and it is considered advisable to reduce those operations which necessitate handling the plant to the absolute minimum.

When the plants are from eight to ten weeks old the flower head begins to make its appearance. Were this allowed to develop normally and produce seed, maturity would be seriously delayed, and, moreover, the yield of leaf would be light and of inferior quality. Consequently, the plant has to be "topped," and this is one of the most important operations in the growing of the crop. It will be readily understood that by topping low the whole vigour of the plant will be diverted to the few remaining leaves, and on good soil or in a growthy season these leaves will be coarse and heavy. On the other hand, if the plant is topped too high the higher leaves will be small and trashy and of little value. In a dry season, of course, it is obviously necessary to top lower than in a wet season when growth is fast and vigorous.

It will be seen from the above that no hard and fast rule can be laid down as to the height to top in any one season or for any particular soil type, and that the grower must be guided largely by his judgment and experience. As a guide it can be said that under Tasmanian conditions plants should be topped so as to leave from 12 to 16 leaves per plant, depending on soil and seasonal conditions. If the operation is delayed until the flowers begin to open, one has a chance of seeing what effect the usual January rains will have on the growth of the crop, and so of forming a better idea of the best height to top.

About a fortnight after topping a further crop of suckers will begin to appear, and these must be removed before they become too large. It may be necessary to sucker the crop twice before harvesting is complete.

Harvesting

It is safe to say that more leaf is spoilt in Tasmania by harvesting in an under-ripe stage than by any other cause. One has only to move round the various sheds at grading time to get an idea of the very high proportion of leaf carrying a distinct tinge of green, and to have the misfortune to have to carry out smoking tests with local leaf to realise how seriously this factor is affecting leaf quality.

Admittedly, the growers are not altogether to blame, for it has been the practice of the manufacturer to judge the quality of leaf by colour and to grade prices on this standard. It is in the effort to obtain bright colour that growers have fallen into the error of harvesting the leaf when immature. Actually, however, it would be much better for both the farmer and the industry if this practice was discontinued. By harvesting thoroughly ripe leaf a certain amount of colour may be sacrificed, but there will be far less reject leaf and a better product for the smoker.

As the plant reaches maturity a distinct change in colour will be noticed in the leaves. The dark green of the growing crop gives way to a lighter pea-green colour, and with some varieties such as Gold Dollar, and on light sandy soils, a distinct yellowing may take place.

At the same time as the colour alters the leaves will become thick and fleshy, the leaf blade tending to crack when doubled up. The cracking of the leaf is in itself sometimes considered a sign of ripeness, but cannot be so regarded. It may be merely a sign of thickness. Leaf should always be picked on colour, and it is quite a good plan to watch the leaf until satisfied it is dead ripe—and then leave it for at least another week.

For the benefit of newcomers to the industry, it should perhaps be mentioned that the tobacco plant ripens from the bottom upwards, from two to four leaves being harvested at each picking. The first pickings can usually be made from three to four weeks after the plants have been topped. Lugs or sand leaves from the bottom of the plant are easy to cure, but are often small and damaged. The middle leaves may be a little harder to cure, but are the most valuable on the plant. The tips or top leaves are difficult to cure, and are usually of indifferent quality.

Curing

On most properties it would appear that a standard technique has been adopted for curing, irrespective of the type or texture of the leaf. The results obtained cannot be regarded as satisfactory, particularly with heavy textured leaf, and growers are advised to give consideration to a modification of their practice in this connection.

Well-cured tobacco is of good colour, texture and aroma, but if in the curing the starch and nitrogenous compounds in the leaf are not altered the resultant tobacco will be dull, harsh, and rank smelling. On rich soils, or in a growthy season when dark green leaf is produced, the "sweating" period should be extended and carried out at low temperatures. In really hot weather it may not even be necessary to fire the kiln, for in the early stages the temperature inside it should only be a few degrees—not more than 10° —higher than the outside readings. With this slow yellowing the life processes are still going on in the leaf. In effect an artificial ripening is taking place, and a breaking down of the nitrogenous compounds is effected. Such a procedure will greatly reduce the risk of producing dark, rank tobacco of an objectionable type.

With this class of leaf particular care must be paid to the ventilation of the barn, and it will probably be found necessary to "crack" the ventilators after 40 to 45 hours of curing with the temperature still below 100° Fahr. A difference of 3° between wet and dry bulb readings at this stage is quite permissible without the risk of damage to the leaf.

Once colour has been obtained the curing is concluded in the usual manner.

With light leaf the usual method is perfectly satisfactory and good colour and texture can be obtained provided the leaf has been ripe when harvested.

In conclusion, growers are reminded that it is compulsory to remove all stalks and roots and destroy same by fire immediately the crop has been harvested. The ready co-operation of growers in the past in this respect has undoubtedly had much to do with our almost total freedom from blue mould, and newcomers to the industry are requested to follow suit and take all reasonable precautions against this disease.

NOTES ON THE NEW SOUTH WALES APPLE INDUSTRY

CONSIDERING that New South Wales provides one of the main outlets for Tasmanian apples, the following notes, compiled by Mr. H. McKay from figures provided by the New South Wales Marketing Bureau and other sources, should be of interest.

With regard to the main varieties grown there, the 1931 census showed that Granny Smith and Jonathan were the most widely planted, with 2,500 acres and 1,900 acres respectively. London Pippin, Rome Beauty and Delicious accounted for another 2,000 acres. In the remaining 3,000 acres Democrat, Gravenstein and McIntosh predominated. Since 1931-32 plantings have been extended, the varieties in favour being Granny Smith, Jonathan, Delicious and Rome Beauty, though several others such as McIntosh have also been widely planted in some areas.

The 1934-35 census of apples reveals a considerable increase in acreage, the aggregate reaching about 13,000.

In the pear section, Williams with some 1,200 acres heads the list, Packham's Triumph, Winter Cole and Beurre Bosc accounting for another 1,200 acres or so. Other varieties brought the total pear acreage up to about 3,200. (In all cases the acreages quoted have been calculated on the basis of a 20ft. plant and must therefore be regarded as only approximate).

Production figures in apples for the 1934-35 and 1935-36 seasons were 1,235,389 and 977,901 bushels respectively; and in pears for the same seasons 333,905 and 396,227 bushels. The main districts in approximate order of importance are Central Tableland, South-Western Slopes, Northern Taleland, Riverina, and South Coast.

It is interesting to note that of the total 1936-37 production, 1,007,000 bushels is confined to six varieties, namely, Granny Smith (460,000), Jonathan, Rome Beauty, Democrat, Delicious and Cleopatra.

Marketing costs vary considerably, but, excluding rail charges, from 2/- to 2/3 per bushel would be the average cost where co-operative sheds are operating. The majority of the districts might be placed within a 9d. rail freight of the Sydney markets.

Whilst Tasmania generally provides the greatest quantity of apples for the Sydney market, New South Wales' sources of supply are almost as important. The export from Victoria often reaches the 200,000 mark. The annual consumption of apples per head of population in Sydney has fluctuated between 29 lbs. and 36 lbs. during the last eight years.

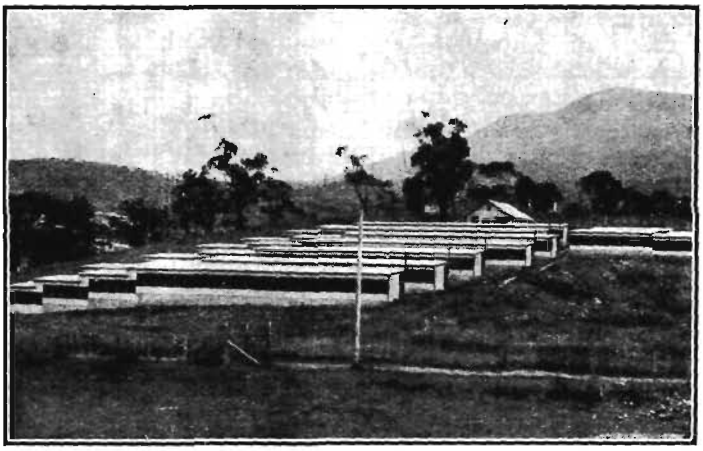
STATE EGG-LAYING COMPETITIONS

SECOND YEAR TEST

By A. E. POWELL, Poultry Husbandryman

SITUATED on a prominent eastern slope of a rise near St. John's Park, New Town, the last series of the State Egg-laying Competitions was held from April 1st, 1936, to March 16th last.

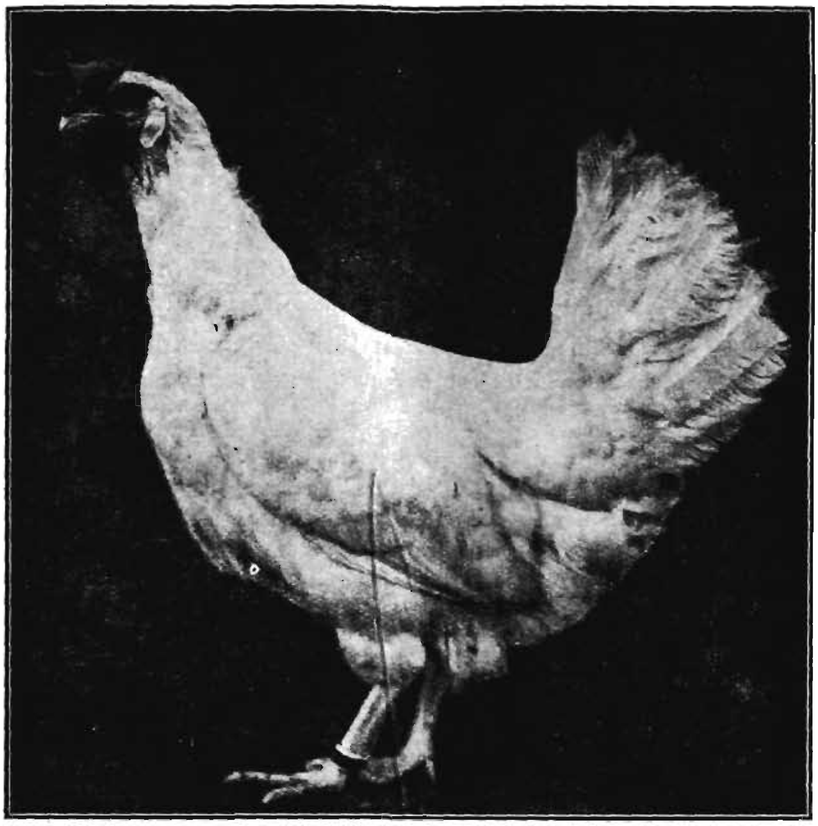
The pens, comprising 400 single-testing units, are constructed of flat galvanised iron with concrete floors and wire-netted fronts. Each bird is provided with a space 6 feet by 3 feet, and each of the buildings has a 3ft. passageway for convenience in feeding, watering, and the collection of eggs. Feed and egg stores are also provided.



STATE EGG-LAYING COMPETITIONS, NEW TOWN

Sixty-two breeders were represented, comprising 17 from Northern Tasmania, 37 from Southern Tasmania, two from the Mainland and six from State schools.

70,179 eggs were gathered during the competition, and the average number of eggs laid per bird was 191.4, the highest individual score being 278 eggs from a white leghorn from Mr. C. Thompson's farm, Glenorchy.



MR. C. THOMPSON'S WHITE LEGHORN

Details are as follows:—

Breed	Entries	Returned to Owner	Mortality	Egg Average
White Leghorn	171	6	5	205.9
Black Orpington	152	1	–	181.1
Any other variety, Light Breed	29	–	1	162.7
Any other variety, Heavy Breed	27	2	2	158.9

Green Food

An abundance of green food, consisting of lucerne, black oats, barley and silver beet, was grown on the area.

AUSTRALIAN PURE-BRED DAIRY CATTLE PRODUCTION RECORDING SCHEME

ANNUAL REPORT

By J. T. ARMSTRONG, Chief Dairy Officer

DURING the year 483 cows from 47 herds completed their lactation periods with an average production of 6,168 lbs. of milk and 288.2 lbs. of butterfat; average test, 4.67 per cent.

Comparison of records for the past ten years is given in the table below.

Year	No. of Cows	Average Butterfat Production
1927-28	166	317.6 lbs.
1928-29	234	299.3 „
1929-30	271	318.2 „
1930-31	219	337.6 „
1931-32	240	294.0 „
1932-33	263	296.6 „
1933-34	290	261.3 „
1934-35	273	280.6 „
1935-36	412	273.4 „
1936-37	483	288.2 „

This year's production is the highest recorded for the past four years, but still cannot be regarded as a high average for pure-bred dairy cattle.

The season did not open well. Winter feed in most districts was short, and production in the early spring was below that of the previous season; however, good spring and summer rains were experienced in many districts, and as a result yields in the latter part of the summer and early autumn were in excess of earlier anticipations.

Of the 483 cows recorded, 259—or approximately half—were below the age of four years at the commencement of test, and in assessing averages allowances must be made for these young stock.

Twenty-one herds had an average production per cow in excess of the average of 288.2 lbs. of butterfat, and of this number several herds contained a high proportion of two and three-year-old cattle, so that the low average cannot be altogether attributed to the percentage of juniors recorded.

Of the 483 cows recorded, 209 qualified for certificates and 274 failed to reach the prescribed standards. Amongst the failures were cows of each of the various age groups.

In the case of four herds, all cows in the herd obtained certicates.

List of Leading Cows in Each Class

Class	Name of Cow	Herd Book No.	Owner	Milk Lbs.	Av. Test	B'fat Lbs.
Mature Cows	Waipiko Best	51059	Barnett, N. R.	9,642	7.03	678.8
Snr. 4-yr.-old	Wingaroo Babette	3934a	Thompson, J. H. (Estate)	11,114	4.61	512.7
Jnr. 4-yr.-old	Valma May	42362	Stuart, L. A.	8,732	5.96	520.5
Snr. 3-yr.-old	Crendon Eminent Sybil	47789	Barnett, N. R.	9,009	5.20	468.6
Jnr. 3-yr.-old	Stronach Aithra	NYA	Scottsdale School Farm	6,907	5.47	377.8
Snr. 2-yr.-old	Palmerston Volunteer's Molly	NYA	Stuart, L. A.	8,785	5.29	465.3
Jnr. 2-yr.-old	Cluan Lil 3rd	47660	Perkins, V.	6,867	5.04	346.2

Herd Summary

No.	Herd Owner	Breed	Average Milk Per Cow (lbs.)	Test, %	Average But'fat Per Cow	Mature	Four Year-old	Three Year-old	Two Year-old	Total No of Cows
1.	Stuart, L. A.	J	7,222	5.82	420.7	6	4	5	3	18
2.	Barnett, N. R.	J	7,552	5.56	419.3	6	1	2	1	10
3.	Beveridge, H. C.	AIS	8,746	4.06	355.6	1	—	—	—	1
4.	Scottsdale School Farm	J	6,643	5.28	351.3	3	—	1	2	6
5.	Kuipers, Capt. D.	J	6,108	5.69	348.0	3	—	1	3	7
6.	Lambert, J. D.	J	6,600	5.26	347.4	2	—	1	1	4
7.	Mervyn Bræ Stud	J	6,418	5.30	340.4	5	—	1	—	6
8.	Lansdell, Mrs. E.	J	6,799	4.88	332.1	6	3	—	4	13
9.	Robotham, H. V.	Fries.	9,933	3.33	331.2	2	1	1	2	6
10.	Treloggen, J. W., and Sons	AIS	8,472	3.74	317.1	3	6	6	4	19
11.	Heazlewood, T. A.	J	5,254	5.98	314.4	1	—	—	2	3
12.	Perkins, V.	J	6,273	5.00	313.8	1	—	7	5	13
13.	Mackenzie, R. G.	AIS	7,711	4.03	311.4	2	—	2	4	8
14.	Thompson, J. H. (Estate)	RP	7,267	4.23	307.9	12	5	3	8	28
15.	Wing, G. H.	Ayr.	7,037	4.36	307.4	3	3	—	1	7
16.	Procter, C. A.	J	5,797	5.26	304.9	4	2	4	2	12
17.	Blundstone, J. E. (Estate)	RP	6,891	4.34	299.4	10	3	4	—	17
18.	Relbia Farm and Dairy Pty. Ltd.	J	5,626	5.20	293.0	5	2	2	8	17
19.	Champion, A.	J	5,346	5.47	292.7	1	2	—	8	11
20.	Harding, W. T.	J	5,073	5.76	292.2	1	—	2	2	5
21.	Griffin, J. V.	J	5,508	5.28	290.9	1	—	—	1	2
22.	Sadler, B. T.	J	5,049	5.61	283.4	7	7	9	11	34
23.	Cowie, A. E.	J	5,499	5.14	282.9	5	1	7	13	26
24.	Ashley Home	Ayr.	6,423	4.36	280.5	3	1	2	1	7
25.	Gardner, H. R.	AIS	7,044	3.92	276.5	—	1	5	4	10
26.	Mental Diseases Hospital	AIS	6,969	3.95	275.3	1	1	—	—	2
27.	Green, S. G.	Ayr.	6,498	4.23	275.3	5	—	1	2	8
28.	Percy, A.	J	5,209	5.09	265.5	3	4	6	5	18
29.	Grindrod, J.	J	4,786	5.40	258.7	14	7	4	7	32
30.	Loane, N. E.	RP	6,238	4.13	258.1	—	—	3	2	5
31.	McDonald, Mrs. C. W.	AIS	5,909	4.36	258.0	2	1	1	—	4
32.	Steel, L. J.	AIS	6,666	3.82	255.1	4	2	14	1	21
33.	Paterson, J. W.	RP	5,863	4.31	252.9	—	—	2	2	4
34.	Bovill, H. Y.	AIS	6,398	3.90	250.9	5	1	1	5	12
35.	Peters, Chas.	J	5,229	4.78	250.4	—	—	1	—	1
36.	Fergusson, F. C.	AIS	5,928	4.18	247.8	—	1	1	5	7
37.	Foster, R. J. L.	Ayr.	6,005	4.11	246.9	5	3	2	1	11
38.	Cannon, S. L.	J	5,027	4.87	245.1	1	—	2	4	7
39.	Hall, E. G.	Ayr.	6,353	3.84	244.0	5	2	4	2	13
40.	Lambert and Roebuck	J	4,500	5.24	235.9	1	1	3	4	9
41.	Reed, G. E. and A. M.	Ayr.	5,310	4.27	226.8	1	1	2	—	4
42.	Scott, H. B.	Ayr.	5,508	4.07	224.3	4	1	4	8	17
43.	Trethewie, F. E.	AIS	5,744	3.89	223.8	3	—	—	2	5
44.	Shoobridge, H. W. and A. G.	A & RP	5,221	4.20	219.6	1	2	—	—	3
45.	Wells, H. L.	AIS	5,425	3.94	214.1	2	1	1	1	5
46.	Gladman Bros.	RP	5,047	4.16	210.1	3	—	—	—	3
47.	Von Stieglitz, H. W. L.	AIS	4,597	3.97	182.5	1	—	1	—	2
						154	70	118	141	483

List of Cows in Order of Merit

MATURE COWS

Standard: 350 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Waipiko Best	J	51059	Barnett, N. R.	5.9	20.7.36	9,642	7.03	678.8
2.	Melton Vale Blossom	J	31275	Stuart, L. A.	6.11	11.11.35	8,719	6.32	551.2
3.	Melton Vale Gladys	J	31277	Stuart, L. A.	7.1	30.8.36	9,545	5.68	542.6
4.	Valma Pride	J	42364	Stuart, L. A.	5.3	1.4.36	8,537	6.08	519.0
5.	Relbia Betsy	J	34917	Barnett, N. R.	8.2	22.11.35	8,827	5.86	517.2
6.	Rannoch Stylish Belinda	J	34966	Kuipers, Capt. D.	5.1	5.9.36	7,360	6.61	486.8
7.	Wingaroo Regret	RP	3961a	Thompson, J. H. (Estate)	5.0	27.8.36	10,959	4.36	478.4
8.	Waipiko Cota	J	51060	Barnett, N. R.	6.0	24.8.36	8,550	5.56	476.1
9.	Fairhill Primrose 2nd	AIS	17831	Mackenzie, R. G.	8.0	2.9.36	10,652	4.31	459.6
10.	Rannoch Hand Maid	J	34426	Kuipers, Capt. D.	5.11	22.7.36	6,918	6.37	440.9
11.	Valma Bell	J	31294	Stuart, L. A.	7.4	12.8.36	6,054	7.19	435.3
12.	Melton Vale Lucy	J	31278	Stuart, L. A.	6.0	29.9.35	7,154	5.96	426.7
13.	Coraville Floss	J	31261	Lambert, J. D.	5.11	6.10.35	7,430	5.65	420.2
14.	Little Mt. Aviatrix	J	40743	Lansdell, Mrs. E.	5.7	12.7.36	7,684	5.43	417.9
15.	Melton Vale Charm	J	31276	Stuart, L. A.	6.11	10.12.35	6,919	6.01	415.8
16.	Allan Water Mina	J	34877	Champion, A.	5.5	15.6.36	6,449	6.44	415.8
17.	Rannoch Silver Dame 2nd	J	25187	Kuipers, Capt. D.	8.3	20.8.36	8,128	5.11	415.7
18.	Palmerston Hawthorn 5th	J	41482	Cowie, A. E.	5.11	9.8.36	8,272	4.97	411.1
19.	Nalinga Topstone	RP	4751a	Blundstone, J. E. (Estate)	7.9	9.4.36	8,787	4.65	408.9
20.	Nalinga Dinah	RP	4020b	Blundstone, J. E. (Estate)	7.8	16.4.36	8,774	4.63	406.4
21.	Martha Vale Linda 3rd	AIS	3290	Treloggen, J. W., and Sons	8.0	23.9.36	11,059	3.65	403.8
22.	Rannoch Rose Petal	J	28338	Sadler, B. T.	7.0	25.5.36	7,390	5.40	399.5
23.	Rannoch Rosebud's Duchess	J	34960	Sadler, B. T.	5.0	19.4.36	6,630	6.02	399.2
24.	Rannoch Silver Linda 5th	J	34962	Lambert & Roebuck	5.0	25.8.36	6,799	5.83	396.9
25.	Stronach Ariadne	J	46260	District School Farm	15.5	16.4.36	7,709	5.14	396.5
26.	Lowestoft Holly	J	28309	Relbia Farm and Dairy Co.	7.4	29.11.35	7,489	5.29	396.4
27.	Rannoch Daisy 2nd's Petal	J	28333	Sadler, B. T.	7.4	22.5.36	7,411	5.32	394.3
28.	Stronach Venus	J	34451	District School Farm	6.4	2.4.36	7,577	5.19	393.6
29.	Mervyn Bræ Glenn's Girl	J	41010	Mervyn Brae Stud	5.9	25.6.36	7,121	5.48	390.8
30.	Calthorpe Misty Morn	J	34950	Perkins, V.	5.2	26.10.35	7,478	5.21	390.1
31.	Moola Lottie	Ayr.	20542	Wing, G. H.	8.10	4.9.36	9,349	4.16	389.2
32.	Burnbank Queen Fobes	Fries.	3399	Robotham, H. V.	8.0	31.5.36	11,208	3.46	388.0
33.	Hallston Essie	J	31271	Heazlewood, T. A.	7.8	27.5.36	6,349	6.05	384.5
34.	Rothstock Pauline	Fries.	4923	Robotham, H. V.	7.8	21.5.36	12,138	3.14	381.8
35.	Martha Vale Maggie 3rd	AIS	8383	Treloggen, J. W., and Sons	6.11	28.8.36	8,377	4.50	377.2
36.	Glen Vina Mermaid	J	39847	Procter, C. A.	5.3	25.9.36	6,729	5.59	376.6
37.	Coraville Matilda	J	52361	Lambert, J. D.	6.5	5.4.36	7,230	5.20	376.5
38.	Coraville Princess 2nd	Ayr.	14169	Scott, H. B.	13.11	23.9.36	9,687	3.87	375.5
39.	Palmerston Canary 3rd	J	28264	Barnett, N. R.	6.8	14.8.36	6,259	5.86	366.9
40.	Lowestoft Golden Lily	J	25088	Relbia Farm and Dairy Co.	8.3	14.9.36	7,279	5.03	366.2
41.	Mervyn Bræ Meg	J	34374	Mervyn Brae Stud	6.6	4.5.36	6,767	5.40	365.7
42.	Martha Vale Maggie 4th	AIS	8384	Treloggen, J. W., and Sons	5.11	25.8.36	8,373	4.35	364.7
43.	Flowering Vale Socks	RP	1792c	Thompson, J. H. (Estate)	11.10	14.8.36	8,710	4.17	363.7
44.	Wingaroo Quince	RP	3167b	Thompson, J. H. (Estate)	5.10	2.9.36	9,146	3.95	361.8
45.	Wingaroo Gealda	RP	2442b	Thompson, J. H. (Estate)	8.1	28.8.36	8,938	4.02	360.1
46.	Stronach Aurora	J	46261	District School Farm	6.11	23.9.36	6,475	5.55	359.7
47.	Enstone Roany 2nd	AIS	3281	Steel, L. J.	6.0	20.9.36	9,847	3.64	359.0
48.	Nalinga Merle 2nd	RP	3438aa	Blundstone, J. E. (Estate)	6.11	12.5.36	8,163	4.38	357.8
49.	Springbanks Viola	AIS	14057	Beveridge, H. C.	5.8	14.9.36	8,746	4.06	355.6
50.	Flowing Vale Winsum	RP	1796c	Blundstone, J. E. (Estate)	10.6	22.3.36	8,129	4.37	355.5
51.	Rannoch Lady Alpha	J	34437	Sadler, B. T.	5.8	26.5.36	5,219	6.80	354.9
52.	Wingaroo Dable 2nd	RP	3065a	Thompson, J. H. (Estate)	6.2	1.9.36	8,608	4.08	351.2
53.	Little Mt. Daisy	J	28304	Lansdell, Mrs. E.	8.8	30.4.36	7,739	4.52	350.5

MATURE COWS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
54.	Olive Dale Faithful	Ayr.	18827	Green, S. G.	10.1	25.9.36	8,149	4.23	345.3
55.	Hiawatha Peggy	Ayr.	27378	Green, S. G.	6.3	31.5.36	7,679	4.47	343.5
56.	Mill Farm Squaw 5th	AIS	3224	Bovill, H. Y.	7.1	18.9.36	8,637	3.95	341.1
57.	Enstone Betty 2nd	AIS	F. Vol. 1	Steel, L. J.	9.0	29.9.35	8,315	4.09	340.8
58.	Moola Mattie	Ayr.	23130	Wing, G. H.	6.10	14.9.36	7,813	4.30	336.1
59.	Relbia Doris	J	34918	Barnett, N. R.	8.4	27.2.36	6,788	4.93	335.2
60.	Ratho Marjoram	RP	2965a	Shoobridge, H. W. and A. G.	10.11	10.8.36	8,362	4.00	335.2
61.	Glen Vina Rosebud	J	39849	Procter, C. A.	5.8	17.12.35	6,689	5.00	334.7
62.	Alanvale Sincerity	Ayr.	23410	Hall, E. G.	7.11	15.8.36	8,057	4.13	333.4
63.	Palmerston Hawthorn	J	24726	Cowie, A. E.	9.2	4.10.35	6,760	4.91	332.0
64.	Fairhill Jane	AIS	3248	Mackenzie, R. G.	11.0	6.9.36	9,038	3.66	331.2
65.	Relbia Lola	Ayr.	22031	Green, S. G.	7.4	17.2.36	7,469	4.41	330.0
66.	Bracknell Queen	J	28303	Lansdell, Mrs. E.	10.10	20.3.36	7,032	4.69	329.9
67.	Moola Venus 2nd	Ayr	20548	Wing, G. H.	8.8	3.9.36	7,198	4.57	329.3
68.	Clifton Bluebell 4th	J	34382	Griffin, J. V.	6.1	30.11.35	6,219	5.28	328.4
69.	Wingaroo Rally	RP	3960a	Thompson, J. H. (Estate)	5.1	14.8.36	7,029	4.66	327.6
70.	Mervyn Bræ Bud	J	34372	Mervyn Brae Stud	6.11	26.7.36	6,048	5.41	327.5
71.	Mill Farm Harriett 7th	AIS	3247	Bovill, H. Y.	6.2	13.9.36	8,333	3.92	327.4
72.	Enstone Sophie 6th	AIS	8341	Bovill, H. Y.	5.2	15.11.35	7,909	4.08	323.4
73.	*Rannoch Silver Pride 3rd*	J	25189	Sadler, B. T.	8.9	4.8.36	6,890	4.67	321.0
74.	Alanvale Pauline	Ayr.	24530	Hall, E. G.	7.1	12.9.36	8,548	3.75	321.0
75.	Inglis Duchess	J	34424	Percy, A.	5.4	25.2.36	6,762	4.72	319.4
76.	Mill Farm Rose Maid	J	34941	Relbia Farm and Dairy Co.	5.1	27.10.35	5,797	5.46	317.1
77.	Little Mt. Dolly	J	34411	Lansdell, Mrs. E.	7.0	24.7.36	6,805	4.65	317.0
78.	Mervyn Bræ Dainty 2nd	J	45155	Mervyn Brae Stud	5.2	3.8.36	6,957	4.54	316.2
79.	Mervyn Bræ Buttercup	J	45154	Mervyn Brae Stud	5.0	10.8.36	5,610	5.62	315.7
80.	Glen Vina Pretty Lass	J	39848	Procter, C. A.	6.1	15.5.36	6,226	5.06	315.3
81.	Wingaroo Gealda 2nd	RP	3947a	Thompson, J. H. (Estate)	5.1	7.8.36	7,957	3.95	314.4
82.	Rostherne Queenie	J	20974	Grindrod, J.	10.1	2.8.36	5,702	5.50	314.0
83.	Relbia Elsie	J	34919	Barnett, N. R.	7.4	13.12.35	6,542	4.77	312.3
84.	Glen Vina Maid	J	25162	Procter, C. A.	8.4	25.8.36	6,875	4.52	311.3
85.	Rostherne Queenie 3rd	J	34393	Grindrod, J.	7.0	11.7.36	5,912	5.15	310.4
86.	Palmerston Hope	J	45631	Cowie, A. E.	5.1	7.9.36	7,328	4.22	309.6
87.	Wingaroo Charm	RP	3063a	Thompson, J. H. (Estate)	6.1	8.9.36	8,264	3.72	308.0
88.	Relbia Effie	J	23765	Relbia Farm and Dairy Co.	8.10	28.9.35	6,619	4.64	307.6
89.	Rostherne Countess	J	46043	Grindrod, J.	5.0	13.9.36	5,763	5.31	307.6
90.	Nalinga Tulip 2nd	RP	1625a	Blundstone, J. E. (Estate)	10.0	29.3.36	6,751	4.55	307.4
91.	Mill Farm Harriett 2nd	AIS	17807	McDonald, Mrs. C.W.	12.9	15.8.36	6,975	4.39	306.6
92.	Rostherne Parva's Delight	J	28293	Grindrod, J.	8.0	14.9.36	5,157	5.94	306.3
93.	Palmerston Daisy	J	19165	Grindrod, J.	11.6	15.9.36	4,854	6.28	304.9
94.	Rostherne Wendy	J	34888	Grindrod, J.	5.8	23.5.36	6,090	4.99	304.2
95.	Wingaroo Keepsake	RP	3166b	Thompson, J. H. (Estate)	6.9	2.9.36	6,641	4.53	301.4
96.	Tasman Wattle	Ayr.	24400	Ashley Home	5.2	14.12.35	6,832	4.41	301.4
97.	Mill Farm Squaw 5th	AIS	3224	Bovill, H. Y.	6.2	2.11.35	6,570	4.54	298.8
98.	Rannoch Vanity	J	34974	Sadler, B. T.	5.0	19.9.36	5,813	5.13	298.3
99.	Hillstead Firefly	J	34397	Harding, W. T.	6.8	3.7.36	6,512	4.57	297.7
100.	Wingaroo Kaaba	RP	2443b	Thompson, J. H. (Estate)	8.10	12.11.36	7,635	3.89	297.3
101.	Enstone Jumper 2nd	AIS	F. Vol. 1	Steel, L. J.	6.8	6.5.36	7,262	4.08	296.4
102.	Rostherne Choice Lass	J	34884	Grindrod, J.	5.10	4.7.36	5,775	5.12	296.1
103.	Rannoch Stylish Roseleaf	J	34971	Sadler, B. T.	5.4	6.9.36	5,730	5.15	295.1
104.	Palmerston Dulcie	J	20971	Grindrod, J.	10.9	13.6.36	5,737	5.14	294.9
105.	Coraville Dolly	Ayr.	21252	Scott, H. B.	9.1	12.10.35	7,814	3.77	294.8
106.	Rostherne Winnie	J	25126	Grindrod, J.	8.11	26.6.36	5,540	5.30	293.8
107.	Hiawatha Queen	Ayr.	27379	Green, S. G.	9.0	8.11.35	7,624	3.82	291.8
108.	Tasman Lotus	Ayr.	22136	Ashley Home	6.11	13.11.35	6,490	4.48	291.2
109.	Enstone Snowy 2nd	AIS	F. Vol. 1	Mental Diseases Hospital	7.2	13.10.35	7,599	3.81	290.1
110.	Palmerston Hawthorn	J	24726	Cowie, A. E.	10.2	24.9.36	5,919	4.88	289.1
111.	Levengrove Petal	J	34369	Cannon, S. L.	6.0	24.10.35	6,069	4.71	285.9
112.	Wingaroo Janette	RP	4057b	Thompson, J. H. (Estate)	5.2	31.8.36	6,696	4.26	285.8
113.	*Pelerine Dolly 6th*	AIS	3233	McDonald, Mrs. C.W.	6.2	18.10.35	6,441	4.39	283.1
114.	Nalinga Dodger	RP	3137b	Blundstone, J. E. (Estate)	8.4	22.3.36	5,914	4.78	282.7
115.	Nalinga Mary 2nd	RP	NYA	Blundstone, J. E. (Estate)	5.1	21.8.36	7,068	3.99	282.2

MATURE COWS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
116.	Tasman Myrtle	Ayr.	22137	Ashley Home	7.6	16.4.36	7,302	3.85	281.3
117.	Relbia Judy	J	25168	Relbia Farm and Dairy Co.	8.2	10.12.35	5,566	5.03	280.3
118.	Quantock Coombe Fanchette	Ayr.	24238	Foster, R. J. L.	8.0	21.9.36	6,788	4.11	279.6
119.	Rostherne Parva's Surprise	J	34392	Grindrod, J.	6.7	11.5.36	5,157	5.41	279.4
120.	Palmerston Mattie	J	41485	Cowie, A. E.	5.5	5.9.36	5,478	5.07	278.2
121.	Little Mt. Evangeline	J	34412	Lansdell, Mrs. E.	6.6	6.5.36	6,933	3.98	276.6
122.	Little Mt. Silvermine	J	40746	Lansdell, Mrs. E.	5.6	31.5.36	5,649	4.88	275.9
123.	Glenore Queenie 2nd	Ayr.	21584	Scott, H. B.	8.1	20.11.35	6,879	3.96	272.7
124.	Olive Dale Della	Ayr.	15379	Green, S. G.	11.1	6.10.35	6,816	3.98	271.3
125.	Rostherne Queenie 2nd	J	28294	Grindrod, J.	8.1	23.9.36	4,481	5.97	267.6
126.	Olive Dale Delight	Ayr.	21970	Foster, R. J. L.	8.0	18.9.36	5,882	4.51	265.7
127.	Karong Maid 3rd	RP	2585d	Gladman Bros.	9.10	31.7.36	5,523	4.78	264.3
128.	Hill Grove Sadie	AIS	8388	Trethewie, F. E.	5.2	8.4.36	6,751	3.88	262.2
129.	Alanvale Avolo	Ayr.	24526	Hall, E. G.	6.7	9.12.35	7,266	3.56	258.9
130.	Nalinga Topnotch 2nd	RP	1623a	Blundstone, J. E. (Estate)	10.11	14.8.36	6,084	4.24	258.2
131.	Enstone Daphne 9th	AIS	8361	Steel, L. J.	5.9	28.9.36	6,071	4.23	257.3
132.	Nalinga Marjorina	RP	5229d	Blundstone, J. E. (Estate)	6.5	15.4.36	6,689	3.84	257.1
133.	Victoria Chenille	RP	2310a	Thompson, J. H. (Estate)	9.10	8.9.36	6,633	3.79	251.5
134.	Inglis Lass	J	24890	Percy, A.	8.1	17.11.35	5,906	4.23	250.3
135.	Coraville Dairymaid	Ayr.	21250	Scott, H. B.	7.1	15.11.35	6,726	3.71	249.8
136.	Olive Dale Buttercup	Ayr.	14037	Foster, R. J. L.	12.6	9.9.36	6,834	3.63	248.6
137.	Mill Farm Lily 13th	AIS	17818	Trethewie, F. E.	8.4	17.3.36	6,752	3.67	248.0
138.	Rostherne Queenie 4th	J	34886	Grindrod, J.	5.1	23.10.35	4,270	5.68	242.6
139.	Enstone Olga 2nd	AIS	3294	Wells, H. L.	6.11	14.9.36	6,204	3.83	238.0
140.	Newstead Stately 12th	AIS	NYA	Trethewie, F. E.	8.7	14.9.36	6,222	3.71	231.0
141.	Alanvale Flower	Ayr.	25710	Hall, E. G.	5.6	1.8.36	6,360	3.61	229.6
142.	Olivedale Fawn 2nd	Ayr.	21972	Foster, R. J. L.	7.4	10.2.36	5,839	3.91	228.8
143.	Inglis Floss	J	28319	Percy, A.	7.0	1.11.35	4,454	5.11	227.9
144.	Rostherne Daisy	J	34388	Grindrod, J.	6.9	16.6.36	3,565	6.38	227.5
145.	Rostherne Chance 2nd	J	34386	Grindrod, J.	6.7	5.5.36	3.431	6.58	225.9
146.	Oakbank Eleanor	Ayr.	15230	Hall, E. G.	11.3	14.11.35	6,492	3.41	221.4
147.	Enstone Daisy 8th	AIS	8339	Bovill, H. Y.	5.1	10.9.36	6,286	3.39	213.1
148.	Quantock Coombe Mattie	Ayr.	25377	Reed, G. E. & A. M.	5.4	9.1.36	4,644	4.54	211.1
149.	Springbanks Daisy	AIS	18631	Von Stieglitz, H. W. L.	8.7	3.5.36	5,040	4.16	210.0
150.	Alanvale Jubilee	Ayr.	20980	Foster, R. J. L.	9.0	5.10.36	4,692	4.38	205.9
151.	Woodburn Prudence	RP	1540aa	Gladman Bros.	9.11	7.9.36	4,944	3.97	196.7
152.	Enstone Topsy 2nd	AIS	F. Vol. 1	Wells, H. L.	6.1	18.10.35	4,336	3.90	169.4
153.	Nalinga Mavis	RP	NYA	Blundstone, J. E. (Estate)	7.0	15.3.36	4,007	4.18	167.5

Average for Mature Cows

Milk, 7,032 lbs. Test, 4.42% Butterfat, 329.1 lbs.

SENIOR 4-YEAR-OLDS

Standard: 330 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Wingaroo Babette	RP	3934a	Thompson, J. H. (Estate)	4.9	14.8.36	11,114	4.61	512.7
2.	Little Mt. Princess Ariel	J	40745	Lansdell, Mrs. E.	4.6	26.11.35	7,661	6.13	460.0
3.	Martha Vale Maggie 5th	AIS	12518	Treloggen, J. W., and Sons	4.11	4.9.36	10,950	3.60	394.4
4.	Martha Vale Queenie 3rd	AIS	A. Vol. 4	Treloggen, J. W., and Sons	4.11	3.9.36	11,288	3.31	373.9
5.	Martha Vale Dairymaid 3rd	AIS	A. Vol. 4	Treloggen, J. W., and Sons	4.11	19.9.36	10,492	3.45	362.4
6.	Allan Water Golden Gem 2nd	J	38680	Champion, A.	4.8	8.9.36	7,235	4.95	358.3

SENIOR 4-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
7.	Allan Water Violet 2nd	J	38684	Champion, A.	4.10	8.7.36	6,393	5.52	353.2
8.	Martha Vale Nellie 4th	AIS	3292	Treloggen, J. W., and Sons	4.11	8.7.36	8,694	3.98	346.3
9.	Nalinga Cherry	RP	NYA	Blundstone, J. E. (Estate)	4.11	29.8.36	8,199	4.21	345.5
10.	Inglis Model	J	34947	Percy, A.	4.7	14.4.36	6,942	4.76	330.4
11.	Relbia Freda	J	41748	Relbia Farm and Dairy Co.	4.10	15.8.36	6,113	5.24	321.0
12.	Pelerine Rose 18th	AIS	13273	Gardner, H. R.	4.8	22.7.36	7,422	4.26	316.7
13.	Inglis Jess	J	34945	Percy, A.	4.11	24.8.36	6,949	4.47	311.1
14.	Tasman Enid	Ayr.	25511	Ashley Home	4.8	14.8.36	5,971	5.20	310.6
15.	Wingaroo Cabiri 2nd	RP	3939a	Thompson, J. H. (Estate)	4.11	9.9.36	6,747	4.58	309.1
16.	Moola Vesta	Ayr.	24132	Wing, G. H.	4.11	2.10.35	7,165	4.27	306.4
17.	Rostherne Golden Queen	J	46047	Grindrod, J.	4.8	26.6.36	5,567	5.48	305.2
18.	Wingaroo Label 2nd	RP	3952a	Thompson, J. H. (Estate)	4.9	16.9.36	6,992	4.19	293.6
19.	Alanvale May	Ayr.	25711	Hall, E. G.	4.11	21.9.36	7,898	3.70	292.7
20.	Levengrove Lucette	J	40709	Lambert & Roebuck	4.11	11.8.36	5,752	4.90	281.8
21.	Rostherne Mayflower	J	46054	Grindrod, J.	4.11	20.5.36	5,414	5.00	271.1
22.	Greyleigh Queenie 17th	AIS	16744	Wells, H. L.	4.7	27.8.36	7,104	3.75	267.0
23.	Rostherne Cream Maid	J	46044	Grindrod, J.	4.8	6.5.36	4,659	5.43	258.5
24.	Rostherne Lovely Chance	J	46052	Grindrod, J.	4.8	24.5.36	5,734	4.46	257.9
25.	Quantock Coombe Lotus	Ayr.	25376	Reed, G. E. & A. M.	4.11	1.10.35	5,894	4.23	249.8
26.	Pleasant Banks Melody	Ayr.	25358	Foster, R. J. L.	4.9	27.5.36	6,308	3.92	247.3
27.	Ranoch Vallete 3rd	J	34973	Sadler, B. T.	4.7	18.4.36	4,176	5.89	246.1
28.	Wingaroo Lena 3rd	RP	3954a	Thompson, J. H. (Estate)	4.6	11.11.36	6,210	3.90	242.4
29.	Rannoch Stylish Beauty	J	34965	Sadler, B. T.	4.10	7.9.36	4,551	4.53	206.5
30.	Wingaroo Lily 2nd	RP	3955a	Shoobridge, H. W. and A. G.	4.6	1.9.36	4.150	4.47	185.7
31.	Gala Rosedale Primrose	RP	3651a	Gladman Bros.	4.7	30.8.36	4,676	3.62	169.3

Average for Senior 4-Year-Olds

Milk, 6,916 lbs. Test, 4.52% Butterfat, 306.0 lbs.

JUNIOR 4-YEAR-OLDS

Standard: 310 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Valma May	J	42362	Stuart, L. A.	4.5	8.11.35	8,732	5.96	520.6
2.	Rothstock Lorraine	Fries.	4249	Robotham, H. V.	4.2	15.8.36	13,591	3.56	484.2
3.	Palmerston Beauty	J	45620	Stuart, L. A.	4.1	26.10.35	7,875	5.74	452.5
4.	Cluan Duett	J	43436	Stuart, L. A.	4.1	25.9.36	8,876	4.82	427.5
5.	Relbia Cecile	J	41744	Relbia Farm and Dairy Co.	4.0	23.9.36	7,171	5.88	421.6
6.	Little Mt. Starlight	J	40747	Lansdell, Mrs. E.	4.5	8.4.36	8,558	4.85	415.1
7.	Little Mt. Dice	J	40744	Lansdell, Mrs. E.	4.5	23.8.36	6,997	5.81	406.7
8.	Cluan Queen	J	43439	Stuart, L. A.	4.1	24.9.36	7,057	5.51	389.0
9.	Pleasant Banks Betsy	J	54782	Barnett, N. R.	4.1	6.11.35	7,253	5.14	372.8
10.	Rannoch Yellow Daisy 5th	J	34975	Sadler, B. T.	4.5	20.1.36	5,822	6.21	362.1
11.	Rannoch Rose Petal 2nd	J	41708	Sadler, B. T.	4.1	20.6.36	6,372	5.25	335.1
12.	Nalinga Dinah 3rd	RP	NYA	Blundstone, J. E. (Estate)	4.0	11.8.36	7,102	4.65	330.7
13.	Enstone Beauty 3rd	AIS	10609	Treloggen, J. W., and Sons	4.1	9.10.36	7,767	4.14	322.2
14.	Glen Vina Bluebell	J	48269	Procter, C. A.	4.1	20.8.36	5,891	5.44	321.0
15.	Rannoch Stylish Daisy	J	41715	Sadler, B. T.	4.4	12.9.36	5,405	5.95	320.7
16.	Nalinga Jewel 2nd	RP	NYA	Blundstone, J. E. (Estate)	4.0	30.8.36	7,555	4.19	317.0
17.	Enstone Daphne 15th	AIS	10615	Steel, L. J.	4.0	22.9.36	8,989	3.50	314.9
18.	Rostherne Dream	J	46045	Grindrod, J.	4.0	7.7.36	6,279	4.72	296.6
19.	Palmerston Muse 2nd	J	50044	Cowie, A. E.	4.1	21.8.36	5,776	5.12	296.0
20.	Pleasant Banks Alison	Ayr.	27609	Foster, R. J. L.	4.0	21.9.36	6,822	4.29	292.7

JUNIOR 4-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
21.	Rannoch Stylish Valrose	J	41721	Sadler, B. T.	4.1	28.6.36	5,036	5.74	289.4
22.	Martha Vale Success 2nd	AIS	12527	Treloggen, J. W., and Sons	4.0	31.10.35	9,253	3.10	287.6
23.	Enstone Mona 4th	AIS	10627	Steel, L. J.	4.0	17.9.36	7,593	3.78	287.4
24.	Enstone Success 8th	AIS	16322	Fergusson, F. C.	4.0	21.9.36	6,790	4.16	282.9
25.	Rannoch Stylish Rosilika	J	34972	Sadler, B. T.	4.4	18.1.36	4,723	5.92	280.0
26.	Wingaroo Bellemena	RP	3937a	Thompson, J. H. (Estate)	4.0	19.9.36	7,180	3.87	278.2
27.	Rostherne Barwin	J	46041	Grindrod, J.	4.4	4.9.36	5,323	5.19	276.8
28.	Rostherne Pretty Chance	J	46057	Grindrod, J.	4.0	30.8.36	5,433	4.92	267.8
29.	Inglis Melba	J	48752	Percy, A.	4.0	4.9.36	5,844	4.45	260.6
30.	Enstone Jill 3rd	AIS	8371	Mental Diseases Hospital	4.1	28.10.35	6,339	4.11	260.6
31.	Inglis Dairy Maid	J	40282	Percy, A.	4.2	29.4.36	4,699	5.53	260.2
32.	Moola Princess	Ayr.	25267	Wing, G. H.	4.0	20.10.35	6,434	4.02	258.8
33.	Coraville Daisy 3rd	Ayr.	25938	Scott, H. B.	4.0	5.10.35	5,785	4.24	245.5
34.	Alanvale Shadow	Ayr.	25713	Hall, E. G.	4.1	16.10.35	6,064	4.03	244.4
35.	Pleasant Banks Cowslip	Ayr.	25353	Foster, R. J. L.	4.0	26.7.36	5,317	4.45	236.7
36.	Moola Valerie	Ayr.	27552	Wing, G. H.	4.1	13.10.36	4,452	4.91	218.8
37.	Glen Vina Marigold	J	48274	Procter, C. A.	4.5	10.9.36	3,968	5.23	207.4
38.	Pelerine Daphne 9th	AIS	13259	McDonald, Mrs. C. W.	4.0	20.11.35	4,705	4.38	206.5
39.	Enstone Lily 3rd	AIS	8340	Bovill, H. Y.	4.4	7.2.36	4,651	4.09	190.6
40.	Strathavon Fancywork	Ayr.	26733	Shoobridge, H. W. and A. G.	4.2	11.12.35	3,153	4.37	137.9

Average for Junior 4-Year-Olds

Milk, 6,565 lbs. Test, 4.71% Butterfat, 309.4 lbs.

SENIOR 3-YEAR-OLDS

Standard: 290 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Crendon Eminent Sybil	J	47789	Barnett, N. R.	3.10	9.8.36	9,009	5.20	468.6
2.	Palmerston Blackberry	J	50036	Cowie, A. E.	3.11	10.8.36	6,653	6.03	401.3
3.	Wingaroo Kaaba 3rd	RP	3950a	Thompson, J. H. (Estate)	3.10	19.8.36	9,057	4.29	389.3
4.	Calthorpe Mignonette	J	39173	Perkins, V.	3.11	13.10.35	7,360	5.24	386.2
5.	Mill Farm Lady Cerise 37th	J	45165	Harding, W. T.	3.11	5.7.36	5,783	6.36	368.1
6.	Palmerston Hester	J	45630	Cowie, A. E.	3.11	16.10.35	6.308	5.66	357.6
7.	Enstone Lily 4th	AIS	10625	Treloggen, J. W., and Sons	3.11	28.8.36	8,511	4.09	348.1
8.	Enstone Olga 3rd	AIS	10628	Treloggen, J. W., and Sons	3.11	29.8.36	8,575	4.02	345.0
9.	Rannoch Valello 2nd	J	41723	Sadler, B. T.	3.8	25.5.36	5,982	5.41	324.0
10.	Wingaroo Revere	RP	3962a	Thompson, J. H. (Estate)	3.7	19.8.36	6,981	4.55	318.3
11.	Wingaroo Dable 4th	RP	3944a	Loane, N. E.	3.10	14.7.36	7,454	4.22	315.0
12.	Wingaroo Celia 2nd	RP	3940a	Paterson, J. W.	3.9	4.7.36	6,474	4.54	293.1
13.	Martha Vale Smutty 5th	AIS	17320	Treloggen, J. W., and Sons	3.9	5.9.36	8,090	3.60	291.9
14.	Wingaroo Cheerful	RP	3941a	Thompson, J. H. (Estate)	3.9	3.6.36	6,412	4.54	291.2
15.	Inglis Queen's Baby	J	48756	Percy, A.	3.9	22.7.36	5,707	5.08	290.1
16.	Rannoch Linda 5th	J	41703	Kuipers, Capt. D.	3.6	28.2.36	5,281	5.42	286.3
17.	Enstone Zenda 3rd	AIS	10640	Gardner, H. R.	3.11	21.9.36	6,939	4.10	284.9
18.	Wingaroo Needful	RP	3956a	Paterson, J. W.	3.9	29.7.36	7,406	3.79	281.2
19.	Hillstead Roylbonette	J	48712	Harding, W. T.	3.11	27.7.36	4,230	6.52	275.9
20.	Melton Vale Bess	J	39485	Percy, A.	3.6	16.11.35	5,274	5.19	273.8
21.	Glen Vina Maid 3rd	J	48273	Procter, C. A.	3.6	15.12.35	5,548	4.72	268.4
22.	Palmerston Royal Pet	J	50045	Cowie, A. E.	3.11	9.9.36	5,821	4.59	267.5
23.	Rannoch Stellinda	J	41713	Sadler, B. T.	3.10	10.8.36	4,965	5.26	261.2
24.	Nalinga Meg	RP	4434aa	Blundstone, J. E. (Estate)	3.9	29.6.36	6,255	4.09	256.3
25.	Rostherne Queenie 5th	J	46058	Grindrod, J.	3.11	28.8.36	5,366	4.72	253.6
26.	Hawthorn Lady	Ayr.	NYA	Foster, R. J. L.	3.8	27.5.36	6,773	3.72	252.3
27.	Inglis Charm	J	48751	Percy, A.	3.11	28.8.36	5,043	4.97	251.0
28.	Enstone Betty 4th	AIS	10610	Steel, L. J.	3.11	15.10.36	6,567	3.80	249.7

SENIOR 3-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs	Test, %	Butterfat Lbs.
29.	*Enstone Dolly 10th*	AIS	10618	Steel, L. J.	3.11	27.8.36	5,651	4.39	248.1
30.	*Martha Vale Spot 5th*	AIS	17321	Treloggen, J. W., and Sons	3.11	2.9.36	6,390	3.83	244.9
31.	Pleasant Banks Actress	Ayr.	27605	Foster, R. J. L.	3.6	2.5.36	5,839	4.08	238.7
32.	Pelerine Pansy 6th	AIS	13270	McDonald, Mrs. C. W.	3.11	15.9.36	5,518	4.27	236.0
33.	Calthorpe Desert Rose	J	43297	Perkins, V.	3.10	8.9.36	4,992	4.70	235.0
34.	Enstone Roany 3rd	AIS	10632	Steel, L. J.	3.9	22.9.36	5,943	3.99	219.6
35.	Rannoch Stylish Valinda	J	41720	Lambert & Roebuck	3.11	6.6.36	4,145	5.17	214.6
36.	Nalinga Marjorina 3rd	RP	NYA	Blundstone, J. E. (Estate)	3.11	16.7.36	5,280	4.02	212.3
37.	Enstone Daphne 17th	AIS	16303	*Steel, L. J.*	3.8	25.8.36	5,095	4.96	208.7
38.	Rannoch *Silver Baby 3rd*	J	41710	Sadler, B. T.	3.10	16.6.36	3,297	5.83	192.3
39.	Enstone Flapper 4th	AIS	10621	Steel, L. J.	3.7	13.4.36	5,045	3.40	172.0
40.	Rannoch *Mignonette 6th*	J	41704	Sadler, B. T.	3.7	7.4.36	2,606	6.48	169.0
41.	Rannoch Stylish *Dame* 2nd	J	41716	Sadler, B. T.	3.8	3.4.36	2,709	5.08	137.8
42.	Enstone Sophie 9th	AIS	10636	Steel, L. J.	3.6	26.9.36	3,581	3.74	134.2

Average for Senior 3-Year-Olds

Milk, 5,939 lbs. Test, 4.61% Butterfat, 274.1 lbs.

JUNIOR 3-YEAR-OLDS

Standard: 270 lbs. **Butterfat**

No.	Name of Cow	Breed	Herd Book Number	*Owner*	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Stronach Aithra	J	NYA	District School Farm	3.2	25.9.36	6,907	5.47	377.8
2.	Enstone Daphne 19th	AIS	10617	Steel, L. J.	3.1	20.9.36	10,308	3.66	377.4
3.	Glen Vina Dahlia	J	48270	Procter, C. A.	3.3	18.4.36	5,935	6.11	362.9
4.	Valma Buttercup	J	46565	Stuart, L. A.	3.3	1.4.36	6,059	5.72	346.7
5.	*Calthorpe Sybil*	J	43301	*Perkins, V.*	3.4	25.4.36	6,926	5.00	346.6
6.	*Martha Vale Model 3rd*	AIS	12519	*Treloggen, J. W., and Sons*	3.0	2.10.35	9,773	3.51	343.9
7.	*Cluan Perfection*	J	43438	Stuart, L. A.	3.1	9.10.35	5,474	6.28	343.9
8.	Rannoch Magnificette	J	45861	Sadler, B. T.	3.2	2.8.36	5,741	5.89	338.2
9.	Nalinga Cherry 3rd	RP	5228d	Blundstone, J. E. (Estate)	3.0	30.6.36	7,503	4.46	335.2
10.	Rothstock *Lorraine*	*Fries.*	4249	Robotham, H. V.	3.4	5.10.35	8,489	3.92	333.1
11.	Cluan Lady Lil 2nd	J	43437	Stuart, L. A.	3.1	5.10.35	6,660	4.96	330.7
12.	Valma Winsome	J	46567	Stuart, L. A.	3.2	4.4.36	6,098	5.39	328.8
13.	Mervyn Bræ Dainty Lass	J	54101	Mervyn Brae Stud	3.1	18.7.36	6,007	5.44	326.8
14.	Frogmore Eliza	AIS	10897	Fergusson, F. C.	3.3	24.12.35	7,302	4.47	326.5
15.	*Calthorpe Salome*	J	47528	*Perkins, V.*	3.0	15.9.36	5,952	5.40	325.2
16.	Crendon Gamboge *Princess*	J	NYA	Barnett, N. R.	3.3	24.11.35	5,644	5.76	325.1
17.	Cluan *Queen*	J	43439	Stuart, L. A.	3.2	3.10.35	5,615	5.73	322.2
18.	Fairhill Pet 3rd	AIS	10731	Mackenzie, R. G.	3.2	30.10.35	7,632	4.21	321.8
19.	Enstone *Betty 5th*	AIS	16299	Steel, L. J.	3.0	26.9.36	7.825	4.07	318.5
20.	Rannoch *Mignonette 7th*	J	41705	Sadler, B. T.	3.5	26.3.36	5,907	5.31	317.0
21.	Glen Vina Sylvia 3rd	J	48276	Procter, C. A.	3.2	31.5.36	5.711	5.54	316.6
22.	Tasman Boronia	Ayr.	26769	Ashley Home	3.5	18.3.36	8,123	3.85	312.8
23.	Cluan Lil 3rd	J	47660	Perkins, V.	3.0	10.9.36	6,880	4.52	311.6
24.	Palmerston Merle	J	50042	Cowie, A. E.	3.0	13.11.35	5.124	6.06	310.5
25.	Wingaroo Lovely	RP	4935a	*Loane, N E.*	3.0	12.9.36	7,703	3.96	305.1
26.	Glen Vina Marigold	J	48274	*Procter, C. A.*	3.5	2.10.35	5,463	5.57	304.4
27.	Rannoch Vallas 4th	J	41725	Sadler, B. T.	3.2	8.10.35	5,148	5.89	303.6
28.	Palmerston Misty	J	50043	Cowie, A. E.	3.0	29.10.35	6.123	4.94	302.5
29.	Enstone Snowy 6th	AIS	10634	Gardner, H. R.	3.0	11.8.36	8,058	3.74	302.0
30.	Palmerston Volunteer's Faith	J	54646	Cowie, A. E.	3.0	1.9.36	6,496	4.46	301.6
31.	Melton Vale *Silky*	J	54078	Percy, A.	3.1	12.9.36	4.757	6.25	297.4
32.	Enstone Warra 2nd	AIS	10639	Gardner, H. R.	3.2	15.12.35	6.546	4.51	296.2
33.	Calthorpe Lady Viola	J	43299	Perkins, V.	3.3	13.12.35	5,615	5.27	296.1
34.	Rannoch Silver Maid 6th	J	45872	*Lambert, J. D.*	3.2	2.9.36	5,214	5.62	293.1

JUNIOR 3-YEAR-OLDS (continued)

Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
35. Calthorpe Jennifer	J	47526	Perkins, V.	3.0	6.9.36	5,985	4.80	287.7
36. Enstone Olga 4th	AIS	16315	Steel, L. J.	3.0	17.9.36	7,988	3.53	282.2
37. Melton Vale Jean	J	49489	Percy, A.	3.0	26.11.35	5,055	5.54	280.5
38. Rannoch Bedelia	J	45856	Sadler, B. T.	3.1	29.7.36	4,720	5.85	276.5
39. Relbia Floss	J	41747	Relbia Farm and Dairy Co.	3.1	29.10.35	4,575	6.02	275.5
40. Ardgowan Memorable Fame	Ayr.	26906	Reed, G. E. & A. M.	3.1	3.10.35	6,584	4.18	275.5
41. Relbia Trixie	J	41755	Relbia Farm and Dairy Co.	3.2	4.12.35	4,941	5.35	264.5
42. Coraville Rita	Ayr.	27045	Scott, H. B.	3.0	3.10.35	5,907	4.37	258.3
43. Levengrove Admiral's Meg	J	44897	Cannon, S. L.	3.1	6.11.35	5,257	4.89	257.4
44. Alanvale Foil	Ayr.	26892	Hall, E. G.	3.1	24.10.35	6,609	3.88	256.8
45. Inglis Pearl	J	53261	Percy, A.	3.2	27.6.36	4,854	5.22	253.7
46. Tasman Snowdrop	Ayr.	26771	Ashley Home	3.0	7.11.35	5,841	4.30	251.6
47. Cluan Soprano	J	47661	Peters, Chas.	3.2	17.11.35	5,229	4.78	250.4
48. The Moat Olive	AIS	18285	Wells, H. L.	3.4	18.3.36	5,169	4.73	244.7
49. Enstone Daphne 18th	AIS	10616	Steel, L. J.	3.5	18.9.36	6,441	3.73	240.8
50. Enstone Rennie 3rd	AIS	16320	Steel, L. J.	3.0	3.9.36	7,176	3.34	239.7
51. Alanvale Mistletoe	Ayr.	27997	Hall, E. G.	3.0	26.10.36	5,321	3.78	239.3
52. Fairhill Pep	AIS	NYA	Mackenzie, R. G.	3.0	13.10.36	6,138	3.89	239.2
53. Coraville Dawn 2nd	Ayr.	27042	Scott, H. B.	3.1	6.10.35	5,498	4.31	237.3
54. The Hill Silverlight 2nd	AIS	14577	Gardner, H. R.	3.4	12.7.36	6,822	3.42	233.8
55. Martha Vale Ivy 3rd	AIS	A. Vol. 4	Treloggen, J. W., and Sons	3.0	20.9.36	6,471	3.57	231.2
56. The Hill Tulip 18th	AIS	NYA	Gardner, H. R.	3.3	6.7.36	7,020	3.27	229.9
57. Rostherne Duchess 2nd	J	46046	Grindrod, J.	3.2	7.11.35	3,963	5.78	229.4
58. Enstone Beauty 4th	AIS	16298	Steel, L. J.	3.0	23.9.36	5,224	4.28	223.5
59. Coraville Golden Queen	J	47743	Lambert & Roebuck	3.2	16.9.36	4,717	4.68	221.0
60. Rannoch Rose 3rd	J	45867	Lambert & Roebuck	3.0	16.6.36	3,964	5.49	217.8
61. Levengrove Primavera	J	44903	Cannon, S. L.	3.0	13.10.35	4,097	5.29	216.9
62. Coraville Meg	Ayr.	28193	Scott, H. B.	3.0	8.10.36	6,260	3.45	216.1
63. Alanvale Fawn	Ayr.	27994	Hall, E. G.	3.1	10.10.36	5,221	4.13	215.9
64. Palmerston Bracken	J	50037	Cowie, A. E.	3.3	10.5.36	3,455	6.13	211.8
65. Nalinga Topnotch 5th	RP	4750a	Blundstone, J. E. (Estate)	3.4	11.8.36	4,896	4.29	210.1
66. Easternside Duchess	AIS	10476	Bovill, H. Y.	3.0	15.3.36	5,179	4.04	209.6
67. Ratho Canna	RP	4810a	Loane, N. E.	3.0	28.11.35	4,966	4.16	206.8
68. Enstone Pride 17th	AIS	16317	Steel, L. J.	3.3	18.11.36	5,394	3.75	202.4
69. Rostherne Some Chance	J	50493	Grindrod, J.	3.0	7.9.36	3,791	5.12	194.2
70. Olivedale Sweetheart	Ayr.	28749	Green, S. G.	3.1	23.11.35	4,120	4.60	189.8
71. Enstone Pride 18th	AIS	16318	Steel, L. J.	3.2	6.11.36	4,973	3.76	187.3
72. Alanvale Melodious	Ayr.	27996	Hall, E. G.	3.0	9.10.36	4,776	3.74	184.9
73. Quantock Coombe Flamingo	Ayr.	NYA	Reed, G. E. & A. M.	3.4	18.12.35	4,118	4.15	170.9
74. Rostherne Parva's Delight 2nd	J	50491	Grindrod, J.	3.0	25.9.36	3,126	5.31	166.0
75. Springbanks Rose 2nd	AIS	18056	Von Stieglitz, H. W. L.	3.3	23.12.35	4,154	3.73	155.0
76. Coraville Pet	Ayr.	28201	Scott, H. B.	3.0	8.10.36	2,574	4.32	111.2

Average for Junior 3-Year-Olds

Milk, 5,833 lbs. Test, 4.63% Butterfat, 270.3 lbs.

SENIOR 2-YEAR-OLDS

Standard: 250 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Palmerston Volunteer's Mollie	J	NYA	Stuart, L. A.	2.10	23.9.36	8,785	5.29	465.3
2.	Melton Vale Mulberry	J	49491	Stuart, L. A.	2.11	19.9.36	6,882	6.61	455.4
3.	Palmerston Volunteer's Mystic	J	54657	Cowie, A. E.	2.11	25.8.36	7,638	5.07	387.5
4.	Palmerston Volunteer's Maid	J	54653	Cowie, A. E.	2.8	27.6.36	6,270	5.89	369.6
5.	Wingaroo Gealda 4th	RP	4925a	Thompson, J. H. (Estate)	2.8	3.6.36	7,558	4.64	350.7

SENIOR 2-YEAR-OLDS (continued)

Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
6. Crendon Charm	J	NYA	Barnett, N. R.	2.8	26.7.36	7,015	4.86	340.9
7. Little Mt. Buttercup	J	49212	Lansdell, Mrs. E.	2.11	18.8.36	7.561	4.38	331.9
8. Fairhill Opal	AIS	NYA	Mackenzie, R. G.	2.10	28.8.36	7,481	4.40	329.6
9. The Hill Duchess 24th	AIS	14558	Gardner, H. R.	2.9	9.7.36	7,825	4.19	328.4
10. Allan Water Mascotte 5th	J	46997	Champion, A.	2.11	28.8.36	5,793	5.60	324.6
11. Stronach Echo	J	NYA	District School Farm	2.7	8.9.36	5,940	5.37	319.2
12. Little Mt. Silver Girl	J	44919	Lansdell, Mrs. E.	2.11	13.10.35	6,694	4.76	319.1
13. Fairhill Jessica 2nd	AIS	NYA	Mackenzie, R. G.	2.11	23.8.36	8,319	3.79	315.4
14. Moola Mona 2nd	Ayr.	27549	Wing, G. H.	2.9	12.6.36	6,847	4.57	313.1
15. Allan Water Vamp 3rd	J	47000	Champion, A.	2.10	11.8.36	5,265	5.75	303.1
16. Coraville Dahlia	J	52358	Lambert, J. D.	2.7	6.7.36	6,528	4.59	299.9
17. Relbia Dove 2nd	J	45898	Relbia Farm and Dairy Co.	2.11	30.9.35	6,062	4.88	295.8
18. Glen Vina Gloria	J	48271	Procter, C. A.	2.6	1.12.35	5,847	5.05	295.3
19. Rannoch Dainty Linda	J	45857	Sadler, B. T.	2.7	24.12.35	5,080	5.85	294.4
20. Rannoch Stylish Valinda 2nd	J	45881	Sadler, B. T.	2.9	30.5.36	4,965	5.76	286.3
21. Salem View Queen 2nd	AIS	18000	Treloggen, J. W., and Sons	2.6	17.9.36	7,443	3.83	285.6
22. Wingaroo Quatrun 3rd	RP	4939a	Thompson, J. H. (Estate)	2.7	16.5.36	5.860	4.73	277.6
23. Wingaroo Belar	RP	4914a	Thompson, J. H. (Estate)	2.9	4.5.36	6,391	4.30	275.2
24. Easternside Rosebud	AIS	10479	Bovill, H. Y.	2.10	18.8.36	7,347	3.73	274.5
25. Palmerston Volunteer's Bloom	J	54645	Cowie, A. E.	2.9	9.8.36	5,085	5.32	270.5
26. Inglis Prim	J	48754	Percy, A.	2.11	4.9.36	4,871	5.53	269.6
27. Palmerston Volunteer's Muse	J	54656	Cowie, A. E.	2.10	7.10.36	5,599	4.73	265.4
28. Wingaroo Quorra	RP	5072b	Paterson, J. W.	2.7	22.5.36	5,324	4.92	262.4
29. Rannoch Rose 4th	J	45868	Sadler, B. T.	2.11	24.9.36	4,678	5.59	261.6
30. Palmerston Volunteer's Heather	J	54650	Cowie, A. E.	2.6	15.1.36	5,600	4.67	261.5
31. Martha Vale Smutty 5th	AIS	17320	Treloggen, J. W., and Sons	2.11	12.10.35	7,802	3.32	259.5
32. Fairhill Janet	AIS	NYA	Mackenzie, R. G.	2.10	23.8.36	6,530	3.96	258.8
33. Martha Vale Jessie 5th	AIS	17313	Treloggen, J. W., and Sons	2.11	13.10.35	6,961	3.71	258.5
34. Wingaroo Zaarana 3rd	RP	4956a	Thompson, J. H. (Estate)	2.8	31.5.36	5,335	4.79	255.9
35. Frogmore Betty	AIS	16468	Fergusson, F. C.	2.6	11.10.35	6,149	4.14	255.0
36. Rostherne Golden Queen 2nd	J	50485	Grindrod, J.	2.9	24.9.36	4,264	5.74	244.8
37. Inglis Proper	J	48755	Percy, A.	2.10	20.8.36	4,759	5.12	243.8
38. Rostherne Silvermine 2nd	J	50492	Grindrod, J.	2.9	18.9.36	3,823	6.20	237.4
39. Pelerine Pansy 7th	AIS	17715	Mackenzie, R. G.	2.8	13.6.36	5,903	3.99	235.9
40. Enstone Arabelle 5th	AIS	10608	Fergusson, F. C.	2.10	13.10.35	5,885	3.97	234.1
41. Palmerston Volunteer's Mary	J	50047	Cowie, A. E.	2.10	1.4.36	4,426	5.27	233.6
42. The Hill Muriel 11th	AIS	14571	Gardner, H. R.	2.6	25.4.36	5,104	4.51	230.4
43. Wingaroo Reparation	RP	4951a	Thompson, J. H. (Estate)	2.6	4.5.36	6,100	3.77	230.3
44. Enstone Jenny 6th	AIS	10624	Fergusson, F. C.	2.7	5.11.35	5,625	4.08	229.5
45. Wingaroo Nancy 2nd	RP	4938a	Loane, N. E.	2.9	30.3.36	5,623	4.01	226.0
46. Palmerston Gem	J	50038	Cowie, A. E.	2.10	16.10.35	4,350	5.14	223.8
47. Wingaroo Rialto 3rd	RP	4952a	Thompson, J. H. (Estate)	2.10	12.5.36	5,380	4.15	223.5
48. Pleasant Banks Bella	Ayr.	28762	Foster, R. J. L.	2.11	18.9.36	4,964	4.43	220.0
49. Levengrove Etiquette	J	49176	Cannon, S. L.	2.10	6.10.35	4,866	4.41	214.9
50. Parkview Heather 2nd	AIS	NYA	Steel, L. J.	2.7	10.11.36	5,164	3.82	197.7
51. Alfriston Silver Splash	J	46959	Lambert & Roebuck	2.10	12.8.36	3,215	6.12	196.9
52. Coraville Pansy	Ayr.	28200	Scott, H. B.	2.10	2.10.36	4,677	4.20	196.6
53. Martha Vale Maggie 6th	AIS	17316	Treloggen, J. W., and Sons	2.11	5.9.36	4,710	3.93	185.1
54. Palmerston Volunteer's Hester	J	54651	Cowie, A. E.	2.10	1.8.36	3,106	5.82	180.9
55. Rostherne Maude 2nd	J	50490	Grindrod, J.	2.11	20.9.36	3,147	5.68	178.9
56. Wingaroo Peach	RP	5070b	Paterson, J. W.	2.7	30.4.36	4,250	4.11	174.9
57. Wingaroo Silver Susie	RP	4513aa	Thompson, J. H. (Estate)	2.7	18.5.36	2,649	4.41	117.0

Average for Senior 2-Year-Olds

Milk, 5,741 lbs. Test, 4.69% Butterfat, 269.7 lbs.

JUNIOR 2-YEAR-OLDS

Standard: 230 lbs. Butterfat

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
1.	Cluan Lil 3rd	J	47660	Perkins, V.	2.1	8.10.35	6,867	5.04	346.2
2.	Rannoch Mignonette 8th	J	45864	Sadler, B. T.	2.1	21.10.35	5,511	5.66	312.2
3.	Rannoch Ranee	J	45866	Sadler, B. T.	2.0	10.10.35	5,506	5.63	310.0
4.	Palmerston Milkmaid	J	54643	Perkins, V.	2.1	15.9.36	7,112	4.30	306.0
5.	*Hallston Vida*	J	48602	*Heazlewood, T. A.*	2.4	30.9.35	5,037	6.01	303.1
6.	Cluan Faith	J	52301	Perkins, V.	1.11	12.8.36	6,343	4.75	301.8
7.	Valma Flora	J	51009	Stuart, L. A.	1.10	8.10.35	4,959	6.06	300.5
8.	Hillstead Firefly 3rd	J	53213	Harding, W. T.	2.0	29.7.36	4,997	6.00	299.9
9.	Bornholm Lucy	J	51901	Kuipers, Capt. D.	1.8	7.8.36	5,029	5.82	292.9
10.	Cluan Golden Belle	J	52302	Perkins, V.	2.0	13.9.36	5,361	5.39	288.9
11.	Levengrove Daisy 2nd	J	49175	Cannon, S. L.	2.4	2.10.35	5,885	4.89	288.3
12.	Enstone Sophie 11th	AIS	10637	Gardner, H. R.	2.1	15.10.35	7,396	3.84	284.0
13.	Relbia Bloom	J	50381	Relbia Farm and Dairy Co.	2.0	26.9.36	5,172	5.47	283.3
14.	Relbia Tottie	J	45903	Relbia Farm and Dairy Co.	2.1	22.10.35	5,530	5.11	282.8
15.	Rannoch Spellinda	J	45873	Sadler, B. T.	2.0	18.10.35	5,042	5.59	282.0
16.	Allan Water Dolly 8th	J	51476	Champion, A.	1.11	28.8.36	5,428	5.10	276.9
17.	Rannoch Stella	J	45874	Sadler, B. T.	2.1	1.10.35	4,611	5.94	274.2
18.	Inglis Pansy	J	53260	Percy, A.	2.3	9.8.36	5,061	5.27	267.0
19.	Palmerston Royal Pet 2nd	J	NYA	Cowie, A. E.	1.10	13.8.36	4,998	5.23	261.6
20.	Stronach Juno 2nd	J	NYA	District School Farm	1.8	15.9.36	5,250	4.97	261.2
21.	Enstone Snowy 6th	AIS	10634	Gardner, H. R.	2.1	30.9.35	7,317	3.54	259.1
22.	Bornho'm Nonny	J	51902	Kuipers, Capt. D.	1.11	15.8.36	5,168	5.01	259.0
23.	Rostherne Choice Lass 3rd	J	50482	Grindrod, J.	2.0	8.8.36	4,681	5.52	258.4
24.	Calthorpe Columbine	J	47525	Perkins, V.	1.9	26.10.35	4,683	5.51	258.1
25.	Allan Water Diamond	J	51474	Champion, A.	1.11	2.8.36	4,836	5.29	255.8
26.	Hallston Esma	J	53109	Heazlewood, T. A.	2.2	26.6.36	4,376	5.84	255.8
27.	Wingaroo Label 3rd	RP	4931a	Thompson, J. H. (Estate)	2.4	19.5.36	6,314	4.04	255.1
28.	Cluan Joy Belle	J	52304	Kuipers, Capt. D.	1.11	28.3.36	4,872	5.22	254.5
29.	Clifton Roylright's Modesty	J	47640	Griffin, J. V.	2.1	28.2.36	4,797	5.28	253.4
30.	Palmerston Hawthorn 6th	J	NYA	Cowie, A. E.	1.9	19.7.36	4,820	5.22	251.8
31.	Little Mt. Dimple	J	49213	Lansdell, Mrs. E.	2.0	10.12.35	5,852	4.28	250.6
32.	Hiawatha Lady	Ayr.	NYA	Green, S. G.	1.11	29.2.36	5,748	4.33	249.2
33.	Glen Vina Queenie 2nd	J	48275	Procter, C. A.	2.5	12.12.35	4,682	5.24	245.7
34.	Allan Water Honesty	J	51481	Champion, A.	2.0	3.9.36	4,410	5.53	244.2
35.	Relbia Minx	J	45900	Relbia Farm and Dairy Co.	2.1	29.10.35	4,539	5.36	243.5
36.	Relbia Frill	J	50382	Relbia Farm and Dairy Co.	1.11	13.9.36	4,213	5.74	242.2
37.	Relbia Thora	J	45902	Relbia Farm and Dairy Co.	2.0	24.10.35	5,541	4.32	239.6
38.	Wingaroo Lovely	RP	4935a	Loane, N. E.	2.1	20.10.35	5,444	4.36	237.7
39.	Relbia Vere	J	45904	Relbia Farm and Dairy Co.	1.10	11.10.35	4,425	5.37	237.7
40.	Alfriston Valette	J	51463	Lambert & Roebuck	1.10	6.8.36	4,724	5.01	237.0
41.	Allan Water Dolores	J	51477	Champion, A.	2.3	7.8.36	3,740	6.29	235.5
42.	Allan Water Clotho 4th	J	51472	Champion, A.	1.11	9.8.36	4,852	4.79	232.9
43.	Levengrove Lynette 3rd	J	49179	Cannon, S. L.	2.5	7.10.35	4,525	5.14	232.8
44.	Easternside Violet	AIS	16229	Bovill, H. Y.	2.0	19.9.36	6,194	3.74	231.9
45.	Coraville Pet	Ayr.	28201	Scott, H. B.	2.0	23.10.35	4,949	4.66	231.1
46.	Easternside Squaw	AIS	16228	Bovill, H. Y.	2.1	16.9.36	6,115	3.72	227.9
47.	Coraville Pansy	Ayr.	28200	Scott, H. B.	1.11	19.10.35	5,246	4.31	226.2
48.	Rannoch Dainty Petal	J	50345	Sadler, B. T.	2.0	13.5.36	3,603	6.23	224.4
49.	Rannoch Valrose 3rd	J	50359	Sadler, B. T.	2.0	20.6.36	3,852	5.72	220.5
50.	Levengrove Valentina	J	49183	Cannon, S. L.	1.11	1.1.36	4,492	4.89	220.0
51.	Allan Water Houri 5th	J	51482	Champion, A.	1.11	2.9.36	4,052	5.42	219.8
52.	Hillstead Bud	J	53212	Harding, W. T.	2.0	29.7.36	3,846	5.70	219.3
53.	Inglis Jean's Babs	J	53257	Percy, A.	1.8	21.7.36	3,572	6.11	218.5
54.	Tasman Dairymaid	Ayr.	27811	Ashley Home	2.5	13.3.36	4,402	4.88	215.2
55.	Rostherne June	J	46051	Grindrod, J.	2.4	15.10.35	4,204	5.03	211.6
56.	Rostherne Golden Queen 2nd	J	50485	Grindrod, J.	1.10	25.10.35	4,204	5.03	211.6
57.	Palmerston Volunteer's Hawthorn	J	54649	Cowie, A. E.	2.1	6.11.35	4,246	4.95	210.0
58.	Relbia Posy	J	45901	Relbia Farm and Dairy Co.	1.11	30.9.35	4,618	4.47	206.6
59.	Hill Grove Stately Princess	AIS	16829	Trethewie, F. E.	2.3	17.1.36	4,782	4.30	205.7
60.	Enstone Success 11th	AIS	16323	Fergusson, F. C.	2.1	22.10.35	5,079	4.04	205.5

JUNIOR 2-YEAR-OLDS (continued)

No.	Name of Cow	Breed	Herd Book Number	Owner	Age	Date of Calving	Milk, lbs.	Test, %	Butterfat Lbs.
61.	Easternside Harriett	AIS	10477	Bovill, H. Y.	2.3	14.2.36	5,232	3.95	204.3
62.	Rothstock Ramona	Fries.	NYA	Robotham, H. V.	1.10	21.6.36	6,725	3.02	203.5
63.	Rannoch Silver Linda 8th	J	50351	Sadler, B. T.	2.1	10.9.36	4,004	5.06	202.9
64.	Alanvale Mistletoe	Ayr.	27997	Hall, E. G.	2.0	30.10.35	5,289	3.83	202.8
65.	Frogmore Eliza 2nd	AIS	16469	Fergusson, F. C.	1.11	26.10.35	4,666	4.31	201.5
66.	Rothstock Princess Marina	Fries.	NYA	Robotham, H. V.	1.9	4.5.36	7,446	2.64	196.6
67.	*Coraville Ruby*	Ayr.	28203	Scott, H. B.	1.10	4.10.35	4,432	4.41	195.7
68.	Coraville Meg	Ayr.	28199	Scott, H. B.	2.0	12.10.35	5,108	3.77	192.7
69.	Coraville Golden Queen	J	47743	Lambert & Roebuck	2.3	8.10.35	4,264	4.48	191.4
70.	Palmerston Volunteer's Hope	J	54652	Cowie, A. E.	2.2	13.11.35	3,736	5.06	189.1
71.	Rostherne Queenie 7th	J	55113	Grindrod, J.	1.10	25.8.36	3,148	5.85	184.4
72.	Palmerston Volunteer's Favourite	J	54648	Cowie, A. E.	2.2	14.11.35	3,612	5.04	182.2
73.	Olive Dale Delphinium	Ayr.	NYA	Green, S. G.	2.0	2.11.35	4,384	4.14	181.6
74.	Coraville Pretty	Ayr.	NYA	Scott, H. B.	1.11	23.10.35	4,284	4.16	178.5
75.	Inglis Marvel	J	53258	Percy, A.	1.8	27.6.36	3,264	5.33	174.2
76.	Coraville Daffodil	Ayr.	28198	Scott, H. B.	1.11	31.10.35	4,139	4.17	172.8
77.	Hill Grove Meryabelle	AIS	16827	Trethewie, F. E.	2.4	8.11.35	4,213	4.08	172.2
78.	Alanvale Flossie	Ayr.	27995	Hall, E. G.	2.0	28.10.35	4,696	3.65	171.6
79.	Pelerine Rose 20th	AIS	13275	Bovill, H. Y.	2.2	31.10.35	4,324	3.89	168.5
80.	Little Mt. Beatrice	J	49211	Lansdell, Mrs. E.	1.7	1.11.35	3,228	5.13	165.7
81.	Alfriston Queenie	J	51462	Lambert & Roebuck	1.4	19.9.36	2,925	5.66	165.6
82.	Coraville Patience	Ayr.	NYA	Scott, H. B.	2.0	24.10.36	3,684	4.32	159.4
83.	The Moat Nancy	AIS	18284	Wells, H. L.	1.8	26.6.36	4,312	3.51	151.3
84.	Rannoch Lena	J	45859	Sadler, B. T.	2.1	21.11.35	2,588	5.65	146.4

Average for Junior 2-Year-Olds

Milk, 4,838 lbs. Test, 4.81% Butterfat, 233.0 lbs.

ABORTION-FREE HERDS

As at 30th September, 1937

THE following herds have been declared free of Contagious Abortion in accordance with the requirements of the scheme for certifying herds.

Northern District

Owner	Address
Ashley Home for Boys	Deloraine
Badcock, B. M.	"Willow Vale," Whitemore
Badcock, F. R., and Sons	Whitemore
Badcock, L. A.	Whitemore
Barker, A. C.	Lemana Junction
Barker, F. T.	Ravenswood
Beardwood, T. J.	Peel Street, Prospect
Cowie, A. E.	Flowery Gully
Foster, R. J. L.	"Pleasant Banks," Evandale
Gardner, H. R., and Sons	Relbia
Gladman Bros.	Carrick
Gowans, W. C.	Glengarry
Green, S. G.	Penquite
Hall, E. G.	"Alanvale," Launceston
Heazlewood, H. R.	Whitemore
Heazlewood, Roy K.	Whitemore
Heazlewood, Tas. A.	Hagley
Hingston, S. J.	"Rosaville," Whitemore
Lansdell, Mrs. Elsie	Bracknell
Relbia Farm and Dairy Co.	Relbia
Reynolds, H. B.	Relbia
Scott, H. Barclay, and Sons	Whitemore
Stancombe, A. J.	Western Junction
Stuart, L. A.	"Valmont," Whitemore
Thompson's Estate	"Wingaroo," Emita, Flinders Isl.
Wells, H. Lucadou	"The Moat," Carrick

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Briggs, C. H.	"Cloverlea," Scottsdale
Dilger, A. C.	Herrick
District School Farm	Scottsdale
Edwards, J. C.	Derby
Geale, G. B.	Jetsonville
Goss, L. V.	West Scottsdale
Haines, H. C.	"Cranleigh," Ringarooma
Hookway, H. H.	Scottsdale
Jessup, A. V.	Springfield
Johnson, J. F. and G. M. L.	"Queechy," St. Helens
Loosmore, T. C.	Scottsdale
McKenzie, F. R.	Winnaleah
Mervyn Bræ Stud	Scottsdale
Priestley, Tas. R.	North Scottsdale
North-Eastern Soldiers' Memorial Hospital	Scottsdale
Ranson, F. W.	Derby
Ranson, J. S.	Branxholm
Robinson, H. A.	New River, via Ringarooma
Salier, H. G.	Scottsdale
Smith, Eric J.	Springfield
Steel, L. J.	Falmouth
Treloggen, D.	St. Helens
Treloggen, J. W., and Sons	St. Helens

Owner	Address
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Williams, J. H.	Springfield

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Malley, E. R.	Roger River
Ollington, W. L.	Forest
Spinks, L. K.	Lileah

North-Western District

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Briggs, G. H.	Glance Creek
Cannon, S. L.	Gunn's Plains
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Hiscutt, J. T.	Howth
Kuipers, Capt. D.	Wynyard
Lakin, G. M.	Gawler
Lambert, J. D.	Latrobe
Lambert, K. T.	Merseylea
Loane, N. E.	Wesley Vale
Mackenzie, R. G.	Somerset
Morse, R. V.	Yolla
Parsons, G. H.	Thirlstane
Perkins, V.	"Calthorpe," Latrobe
Robotham, H. V.	"Rothstock," Ridgley
Roebuck, Newcombe	"Alfriston," Native Plains
Sadler, B. T.	"Rannoch," East Devonport
Townsend, A. W.	Ridgley
Trethewie, F. E.	Lower Mt. Hicks
Wells, J. L.	Upper Mt. Hicks
Wing, S. E.	Preston

Southern District

Allanby, C.......	Bream Creek
Alomes, Mrs. V.	Bream Creek
Bryan, J. R.	Copping
Clifford, Frank G.	Kellevie
Cooley, H. S.	Bream Creek
Dransfield, W.	Copping
Featherstone, G. J.	"Belmont," Sorell
Fergusson, F. C.	"Brooklyn," Penna
Fisher, James E.	Oatlands
Hanslow, G. T.	"Green Fields," Cambridge
Hay, R. J.	Lindisfarne
Mental Diseases Hospital	New Norfolk
Meredith, D. O.	Plenty (Box 634B, G.P.O., Hobart)
Reed, G. E.	Berriedale
Smith, W. J.	Copping
Tatnell, T.	Bream Creek
Taylor, M. K.	Brighton
Watchorn, J. B.	Kingston

CHILD WELFARE NOTES

By OLIVE M. GREEN, Sister-in-Charge, Baby Health Clinic, Launceston

THE BABY NEEDS SLEEP

IT IS well known that bad feeding causes much harm among babies and toddlers, but few people realise the damage that may be done by failing to ensure uninterrupted sleep and regular rest throughout early childhood. It has been proved that it is during sleep that nature repairs the worn-out parts and attends to the main growth of the body. It will be appreciated, then, how important it is that the maximum amount of sleep should be provided for during the period of rapid development of the body in early infancy.

Amount of Sleep Necessary

Here is a table showing the average amount of sleep needed for good health and growth.

Age	Time Needed for Sleep	Hours Awake
1 month	21 hours	3 hours
6 months	18 ,,	6 ,,
1 year	15 ,,	9 ,,
4 years	13 ,,	11 ,,
6 years	12 ,,	12 ,,
9 years	11 ,,	13 ,,
15 years	9 ,,	15 ,,
25 years	8 ,,	16 ,,
50 years	7 ,,	17 ,,

Lack of Sleep

The "tired child" is usually a very cross child and is often scolded for behaviour which he is entirely unable to help. He will also be habitually fretful and peevish, with dark circles under his eyes; he will display a finicky tendency as regards appetite, and his general condition will be a little below par; also, he will not readily gain weight and his mental progress will be slow.

Generally speaking, there are two main types of children which suffer from lack of sleep. One is the highly-strung, over-coddled child of the conscientious, intelligent, but usually over-anxious, "nervy" type of mother; the other exists in a careless, happy-go-lucky environment, where method and regularity are unknown and there is no fixed bed-time. In the first instance the child cannot sleep because of the mental atmosphere of nervous tension created by over-anxiety on the mother's part; in the second place, sleep is prevented simply owing to lack of opportunity.

If the infant is suffering from lack of sleep it is imperative to investigate, find the cause and remove it. Sometimes it is the father who is the main offender, by playing with the baby when he wakes up in the evening, or when he demands a romp before sleep. This may be the beginning of trouble and lead on to disastrous results.

Training the Young Baby

Do not begin feeding the young baby in the night, as this starts a bad habit of sleeplessness which may injure his whole life. If he wakes at night, change him; turn him over on to his other side, see that he is warm, dry and comfortable; and, if necessary, give him a drink of warm, boiled water; then tuck him firmly in his crib, and he will soon learn that the night time is sleep time. The habit of sound sleep is thus learnt from birth.

It is ideal to let baby sleep by himself in a room alone, warmly tucked in his own crib with his own light bed clothing. Make sure there is a free current of fresh air flowing through the room, and the cot in a position away from draughts. Heavy bed-clothes and a stuffy room are frequent factors in disturbed sleep. During the day-time let the child sleep outside in the open air as much as possible, using a tree or verandah to protect the eyes from the direct rays of the sun. If baby is suitably clad and warmly tucked up in his cot or pram, there is no need to keep him indoors on dull or cloudy, or even wet days, provided he is adequately protected from wind and rain.

A child who has been properly trained will sleep through the ordinary household and everyday noises. Even the wireless, gramophone or piano will not disturb him, and certainly not the noise of traffic or the barking of dogs, etc. Those very "nerves" which seem to a proud mother the sign of a highly-strung, sensitive temperament, are probably the result of bad training, broken rest, and the stimulating of the infant at a time when he should have been fast asleep.

Undisturbed Rest and Sleep

Let *nothing* interfere with your child's regular habits, especially with his day and night sleep. Remember, it is inexcusable to allow a baby or toddler to accompany his mother to picture shows and on other outings when he should be warmly tucked up in his bed. Also bear in mind that a great deal of serious harm is done by taking the small child on long and tiring outings on Sundays and holidays, under which conditions it is impossible to secure the necessary quiet for baby's rest-time.

The first thought in the parents' minds should be that the baby *must* have the means whereby to develop perfectly in body, mind and character.

A PAGE FOR THE COOK

By A. C. IRVINE, Mistress Domestic Science, Education Department

PASTRY

CORNISH PASTIES

6 ozs. short crust	½ lb. potatoes
½ lb. steak	1 small onion
1 slice turnip	¾ teaspoon salt
¼ teaspoon pepper	Small piece of butter

(1) Cut up steak, potatoes and onion very small, and mix with them salt and pepper. (2) Make short crust and roll out fairly thin. (3) Cut out six rounds the size of a small saucer. (4) Put a little of the meat mixture on each round and wet half-way round with milk or egg yolk. (5) Put a small piece of butter, the size of a thimble, on each one, and close up and form an edge. (6) Ornament this edge by pinching it. (7) Glaze with milk or egg yolk and prick and cook for three-quarters of an hour in a fairly hot oven at first. (8) Serve on hot dish with sprigs of parsley.

FRUIT PIE (except Apple)

6 ozs. short crust	2 ozs. sugar
Fruit	½ gill water

(1) Prepare fruit and put into a pie dish with sugar and water. (2) Make and roll out pastry half-an-inch larger than the pie dish. (3) Cut half-an-inch strip off pastry and put round the edge of pie dish, turning the cut side out. (4) Fit the pastry on top of this and trim edges. (5) Glaze with sugar and water or egg-white, and bake for 1 hour. (6) Serve with a table napkin pinned round dish and icing sugar sifted on top.

APPLE PIE

6 ozs. flakey pastry	6 cloves
8 large apples	1 gill water
2 ozs. sugar	

(1) Peel and cut up half the apples and put into a pie dish with sugar, cloves and water. (2) Peel and cut up the other half of apples and fill pie dish. (3) Roll out pastry half-an-inch larger than pie dish and put a half-inch strip of pastry round the edge of pie dish. (4) Fit rest of pastry on top and trim edges. (5) Glaze with egg-white or sugar and water, and cook 1 hour. (6) Serve with table napkin pinned round dish, with icing sugar sifted on top.

STEAK AND KIDNEY PIE

1½ lbs. steak	¾ teaspoon salt
3 sheeps' kidneys	¼ teaspoon pepper
1 onion	½ oz. flour
¾ pint water	6 ozs. Flakey Pastry

(1) Cut up steak, kidneys and onion, and put into pie dish with salt, pepper, flour and water, and mix well. (2) Put another pie dish on top and stand in oven for 1½ hours. (3) Take out and let get cool. (4) Make pastry and roll out half-an-inch larger than pie dish. (5) Fit a half-inch strip of pastry round dish and fit on rest of pastry. (6) Ornament with leaves, etc., with scraps of pastry. (7) Make a hole to let out gas and glaze with milk or egg yolk.

MUTTON AND HAM PIE

Same recipe as Steak and Kidney Pie, using 1½ lbs. leg chops and 4 ozs. ham or bacon instead of steak and kidneys.

VEAL AND HAM PIE

Same recipe as Steak and Kidney Pie, using 1½ lbs. veal and 4 ozs. ham with two hard-boiled eggs cut up and added, instead of steak and kidneys.

RABBIT PIE

Same recipe as Steak and Kidney Pie, using one rabbit and 4 ozs. bacon, instead of steak and kidneys.

CUSTARD TARTS

6 ozs. short crust	½ pint milk
2 eggs	¼ teaspoon salt
Vanilla or lemon	1 oz. sugar
Nutmeg	Butter

(1) Make pastry and roll out fairly thin. (2) Cut out little rounds and fit them into greased custard tins. (3) Beat eggs, sugar and salt together and mix in the milk and 6 drops essence. (4) Pour a little of the custard into each tart. (5) Grate nutmeg on top and add a small piece of butter to each one. (6) Bake in a moderate oven for 40 minutes. (7) Take out of tins when slightly cool.

EGG AND BACON PIE

6 ozs. rough or puff pastry	4 or 5 eggs
½ lb. bacon	Pepper

(1) Make pastry and cut in half. (2) Roll out one half and fit on an enamel plate. (3) Cut off rind of bacon and cut into neat pieces and put on top of pastry on plate. (4) Break in the eggs and sprinkle each one with pepper. (5) Wet edge of pastry and roll out the other half of pastry, fit on top and trim edge. (6) Glaze with milk or egg yolk, prick, and bake 1 hour in fairly hot oven at first.

CRAYFISH OR OYSTER PATTIES

1 crayfish (small) or 1 doz. oysters	6 ozs. puff pastry
1½ ozs. butter	Salt and pepper to taste
1 oz. flour	Little nutmeg
½ pint milk	1 dessertspoon lemon juice
	2 tablespoons cream

(1) Make pastry and roll out thinly. (2) Cut out little rounds and stamp out one round, leaving a wide ring. (3) Put the ring on top of a round and bake in a hot oven (at first) for 20 minutes. (4) Cut up crayfish or oysters. (5) Melt butter in saucepan, take off fire and stir in the flour, salt, pepper and nutmeg, and stir over fire till boiling. (6) Add lemon juice, chopped crayfish (or oysters) and cream. (7) Put a little in each pastry case and put the little stamped-out cooked round of pastry on top. (8) Decorate or garnish with crayfish claws and legs and parsley sprigs.

CHEESE AND EGG PATTIES

Same recipe as Crayfish Patties, using 2 ozs. grated cheese and two hard-boiled cut-up eggs instead of crayfish. Serve hot.

CHEESE NUT FINGERS

6 ozs. rough puff pastry	Salt and cayenne to taste
3 ozs. cheese	4 ozs. walnuts
1 egg-white	

(1) Roll out pastry and spread with the grated cheese. (2) Fold in three and roll out three times. (3) Glaze with slightly-beaten egg-white and sprinkle with the chopped walnuts and a little more salt and cayenne. (4) Cut into fingers and bake in a hot oven at first for 20 to 25 minutes. Serve cold with parsley.

SWISS FINGERS

Puff pastry	Whipped cream
Raspberry jam	White icing

(1) Roll out pastry not too thinly and cut into oblong pieces about 4 inches by 1½ inches and bake for 20 minutes till brown. (2) When cold, split and put a very little jam in each one and a little whipped, sweetened, flavoured cream on top of jam and stick together again. (3) Ice the top with white icing.

NAPOLEONS

6 ozs. puff pastry	Raspberry jam
Sponge sandwich mixture	6 ozs. white icing
4 ozs. almonds	Whipped cream

(1) Make pastry and cut into two equal parts and cook 15 to 20 minutes on backs of Swiss Roll tins. (2) Make cake and cook in a Swiss Roll tin, and when cold split and spread with whipped, sweetened, flavoured cream. (3) Spread one lot of pastry with jam and put cake on top of it. (4) Spread top of cake with more jam and put the other piece of pastry on top. (5) Ice with white icing and sprinkle chopped blanched almonds on top. (6) When set, cut into squares.

APPLE AND PASSION FRUIT TART

6 ozs. flour	3 tablespoons milk
¼ teaspoon salt	4 apples
¼ teaspoon soda	3 passion fruit
½ teaspoon cream of tartar	4 ozs. sugar
4 ozs. butter	

(1) Sift flour, salt, cream of tartar and soda. (2) Rub in butter with fingers and mix in milk, and work to a fairly stiff dough with hand or knife. (3) Turn on to floured board and cut in half. (4) Roll out one half round and fit on a plate. (5) Peel and cut up apples small, and mix with the passion fruit pulp and sugar, and put on pastry on the plate. (6) Wet the edge, roll out the other half and fit on top. (7) Trim off edges and glaze with milk and cook three-quarters of an hour in a fairly hot oven at first. (8) Sift icing sugar on top and serve hot or cold.

SAVOURY VOL-AU-VENT

½ lb. puff pastry	1 set cooked brains
4 ozs. cooked meats (chicken, veal or rabbit)	1 oz. ham or bacon (cooked)
	Salt and cayenne to taste
1 oz. flour	1½ gills milk
1½ ozs. butter	2 tablespoons cream

(1) Make pastry and cut out two large rounds the size of a soup plate. (2) Stamp out one of the rounds, leaving a wide ring. (3) Put the ring on top of the round and cook with the small round for 20 minutes in a hot oven at first. (4) Melt butter in saucepan, take off fire and mix in flour, salt and pepper till smooth. (5) Stir over fire till boiling and cook three minutes, then add all the minced meats. (6) Put this mixture in the pastry case and put small round on top. (7) Pipe round join of pastry with mashed, creamed potatoes before re-heating. (8) Serve on hot dish with parsley.

LITTLE MEAT PIES

6 ozs. flakey pastry	½ teaspoon salt
4 ozs. steak or mutton	¼ teaspoon pepper
½ small onion	1 tablespoon tomato sauce
1 gill water or stock	1 teaspoon flour

(1) Mince meat and onion and put into a saucepan with salt, pepper, flour, water and tomato sauce. (2) Stir over fire till boiling, then let simmer 15 minutes, then cool. (3) Make pastry and roll out. (4) Cut out five little rounds for the tops. (5) Cut out five rather larger rounds and fit into five greased patty tins. (6) Put a little meat mixure in each one and wet the edge. (7) Put on tops, prick and glaze with milk or yolk of egg and bake in a hot oven (at first) for half-an-hour.

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